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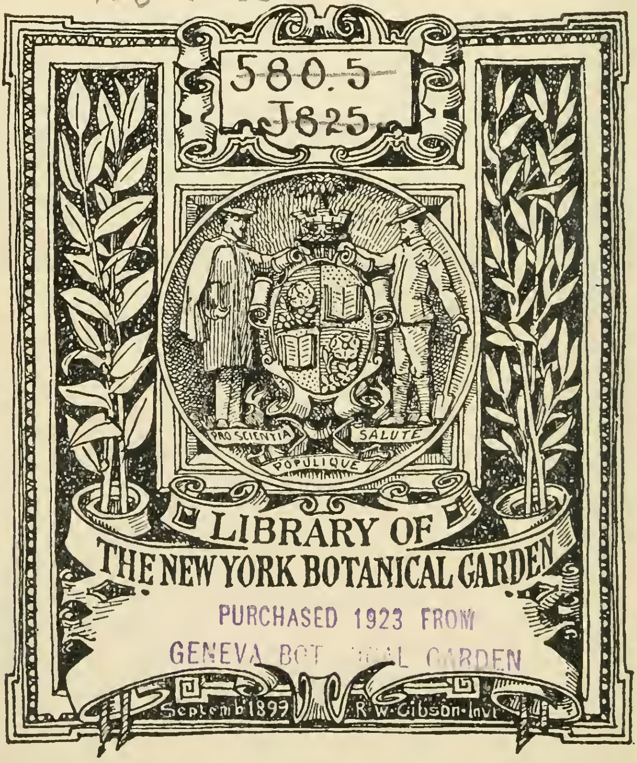

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A NEW FORM OF HELLEBORINE VIRIDIFLORA.

By T. and T. A. Stephenson.

Knowing that we were studying critical British Orchids, Mr. E. W. Hunnybun kindly drew our attention to a curious form of *Helleborine* which occurs at Ventnor, and which has not hitherto been definitely identified. He forwarded to us several fresh specimens, with details as to their habitat. At first sight it did not seem possible to refer this form to any British species, but on entering into detail we found that, although differing markedly in general facies from the Lancashire coast plant, our Ventnor form was undoubtedly *H. viridiflora* (Reichb.) Wheldon & Travis. But taking into account the differences in form and habitat, it seemed advisable to record it as a *forma*: we deprecate giving it the rank of a variety or subspecies.

Helleborine viridiflora (Reichb.) Wheldon & Travis forma vectensis, form. nov.

A forma *dunense* (vide infra) his characteribus differt:—

Tota planta delicatior et gracilior. *Folia* potius cano-viridia quam flavo-viridia, minora, laxiora et angustiora; undulata; costæ minus prominentes. *Flores* multo inclinatiores. *Petala et sepala*, hæc præsertim, longiora, angustiora et acuminatiora. *Labelli hypochilium* aliquantum minus ventricosum.

In loco umbroso crescit, forma *dunensis* in aprico. Ambæ formæ stigma post pollinis massulas habent, et rostellum abortivum.

Plant even more delicate and slender than in the Southport form. *Stems* solitary, practically glabrous below, with slight pubescence above; tinged at the base with dull or bright violet. *Sheaths* of stem several, appressed, the uppermost often funnel-shaped. *Leaves* of a greyer, less yellowish green than in the Southport form, and without the stiff stem-embracing habit of the latter; lax, undulate or twisted, not strongly ribbed; their edges minutely ciliated, but less markedly than in either of the allied species; nerves practically smooth or minutely ciliated; lower leaves lanceolate to elliptic-lanceolate, upper leaves linear-lanceolate to linear, acute; on the whole smaller and narrower than in the Southport form, few and rather distant. *Lower bracts* variable, never much exceeding the flowers. *Flowers* in a lax few-flowered raceme; much more drooping than in the

Southport form; in colour yellowish green, sometimes with the faintest possible tinge of reddish brown externally; petals and sepals, especially the latter, longer, narrower, and more acuminate than in the Southport form. *Label* whitish green, triangular cordate, acuminate, straight or not much recurved, with two low slightly wrinkled lateral bosses, and no median boss. *Hypochile* rather less ventricose than in the Southport form. *Germen* large in proportion to the size of the flower, practically glabrous. *Stigma* placed behind the pollen-masses in such a manner that they, overhanging it, and being very friable, appear easily able to fertilise it; the exact opposite is the case in *H. latifolia*, *atrorubens*, and *violacea*, where the stigma is pushed forward so that the pollen-masses cannot fall upon it. *Rostellum*, a functionless rudiment.

Flowering period. End of July in early seasons; towards the end of August in late ones.

Locality. In shade on chalk, Ventnor, Isle of Wight.

Messrs. Wheldon and Travis have suggested to us in correspondence that possibly this Ventnor plant may be the true *viridiflora* of the Continent, and that the Southport form may be a dune variety of it, since on the Continent *viridiflora* is a woodland plant. Moreover, the undulate leaves of the Ventnor plant point to that conclusion. After consulting Continental works on the subject, it seems to us most probable that, although the Ventnor plant is nearer to the Continental *viridiflora* (especially as described by Rouy, Fl. de France, xiii. 204, 205) than the Southport form, it is hardly quite identical. It is safest to assume that the *exact* Continental form is unlikely to occur in Britain; so for the sake of convenience we propose to call the Ventnor plant *H. viridiflora* forma *vectensis*; and the Southport plant *H. viridiflora* forma *dunensis*. The forma *dunensis* is diagnosed in detail by Wheldon and Travis (Journ. Bot. 1913, 344).

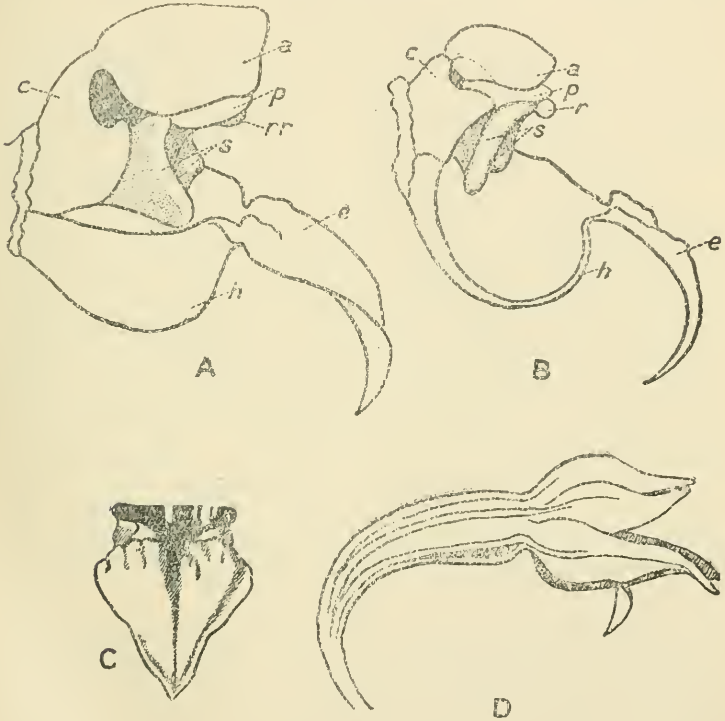
A few points regarding these two forms may be noted with advantage:—

(i.) The Ventnor plant flowers later than the Southport one; but this is only what might be expected, for it grows in the shade, whereas the Southport form grows in a hot situation among sand-dunes, in full sun. Even then, the Ventnor plant flowers earlier than *E. latifolia*, in warm seasons. In cases we have observed of *E. latifolia*, the plant will flower from a fortnight to three weeks earlier when growing in full sunlight, than when growing in deep shade: even when the two spots are within half a mile of each other.

(ii.) The Ventnor plant grows on chalk in the shade, the Southport plant on sand in the sun. But it is no very exceptional thing for two forms of one species to have both these habitats. *H. palustris* has forms growing on chalk, and others on sand-dunes: and even *H. latifolia* may grow out of its natural woodland habitat. For instance, when visiting the Ainsdale sand-dunes in July 1914, we found one large plant of *H. latifolia* among the dunes, close to many flowering examples of *H. viridiflora*: it was only in bud, however.

(iii.) The *habits* of the two forms are quite different, which may be largely accounted for by the different habitats. We have observed quite analogous forms in *H. latifolia*, plants growing in the sun having a similar habit to the Southport plant, others growing in the shade being more slender and comparable to the Ventnor form.

(iv.) Messrs. Wheldon and Travis inform us, that so far as they can tell, the flowers of the Southport form never open at all in cold and wet seasons. In both forms, when the flowers *do* open, they never open so widely as in *H. violacea* and many forms of *H. latifolia.* This is perhaps to be expected in a self-fertilising species.



A. Slightly antero-lateral view of lip and reproductive organs of *H. viridiflora* forma *vectensis.* Much enlarged. B. Slightly antero-lateral view of lip and reproductive organs of a form of *H. latifolia.* The near half of the lip has been removed. Much enlarged. C. Lip of *H. viridiflora* forma *vectensis*, from in front, to show hunches, etc. Enlarged. N.B. The rendering of this lip in harsh black and white gives rather too prominent an appearance to the various parts. D. Whole flower of *H. viridiflora* forma *vectensis*, not fully opened, from the side. Enlarged. c = column: a = anther-cap: p = pollen-mass: r = rostellum: rr = rudimentary rostellum: s = stigma: h = hypochile: e = epichile.

(v.) We wish particularly to emphasize the following details:— In forma *vectensis* the stigma lies behind the friable pollen-masses, which can easily fall on it and fertilise it: the rostellum is rudimentary. Messrs. Wheldon and Travis find that this state of the stigma is also present in forma *dunensis*. Here, therefore, we have a character quite separating both these forms from all forms of *H. latifolia*, *violacea*, and *atrorubens*, in which cases the stigma is pushed forward, and the pollen-masses cannot fall upon it; the rostellum also being large and playing an important part in cross-fertilisation. Apart from this, the smooth ovaries, small green flowers, lip-form, small leaves, slender stem, plainly show that *vectensis* and *dunensis* are only different *forms* of the same *species*.

A word may be said as to the relation of *H. viridiflora* to allied British forms. In all floras known to us, the plant is given as a race or subspecies of *H. latifolia*. Although so treated, several authors have noted the characters described above, of the stigma and rostellum. Darwin, in his "Fertilisation of Orchids," p. 102, notes that Müller (Verhandl. d. Nat. Ver. f. Westfal. Jahrg. xxv. iii. Folge, v. Bd. pp. 7–36) gives the absence of a true rostellum and the self-fertilisation as characters of *H. viridiflora*. Schulze, in "Die Orchidaceen Deutschlands etc.," says in a footnote that Beck has found it to be self-fertilising. Messrs. Wheldon and Travis have *independently* noted this character. In a group of species which contains so many interlacing and puzzling forms, it seems the only right course to seize upon this character, which is by no means a slight, but a very fundamental one, and to give the plant full specific rank. We propose, therefore, that *H. viridiflora* be considered a true and distinct species. It is distinguished from *H. latifolia* and *violacea*, first by the position of the stigma and the absence of a true rostellum, and by having usually smaller greener leaves and flowers, a different lip, and a different habit. From *H. atrorubens* it is distinguished not only by the stigma, etc., but also by the fact that it has a glabrous ovary, whereas the latter has a very hairy one. The lip of *atrorubens* is also completely different, so that even green-flowered specimens of it need not be confused with *viridiflora*. On the question of the other species of *Helleborine* we hope to say more at a later date.

We may add that we have observed the Southport form of *H. viridiflora* in flower in its habitat, and have compared our Ventnor form with both specimens and drawings of it.

We beg to thank Messrs. Wheldon and Travis for information with which they have very kindly furnished us.

ALABASTRA DIVERSA.—Part XXVIII.*

By Spencer Le M. Moore, B.Sc., F.L.S.

Plantæ Rogersianæ.—III.

The following paper, devoted to further descriptions of Archdeacon Rogers's African plants, is proof additional of that gentleman's success as a collector, sometimes even in country previously visited by botanists, and more markedly so in but little known districts. The order adopted, it may be stated, is the lineal one of Bentham and

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* The types of the plants here described are in the National Herbarium.

Hooker's *Genera Plantarum.* For the two first items I am indebted to Mr. E. G. Baker.

Polygala Rogersiana Bak. fil., sp. nov. Perennis; *ramulis* teretibus pubescentibus; *foliis* oblongis vel oblongo-oblanceolatis apice acutis pubescentibus costa media subtus conspicua nervis lateralibus tenuissimis vel subobsoletis petiolo brevissimo pubescente insidentibus; *floribus* mediocribus in racemos laterales pauciflores dispositis; bracteis persistentibus pilis vestitis; *sepalis* exterioribus liberis concavis, alis in sicco pulchre luteis apice acutis suborbicularibus; *carina* alis breviore apice cristata; *capsula* stipitata hirta.

Portuguese East Africa. Villa Machado; n. 4505.

Folia 15–25 mm. longa, 5–6 mm. lata, petiolo brevissimo suffulta. Alæ ± 10 mm. longæ. Carina 6 7 mm. longa.

A noticeable species on account of the oblong or oblong-oblanceolate shortly petiolate pubescent leaves, and showy flowers in short lateral racemes. The wing sepals are yellow, the crest carmine.

Allied in some respects to *P. ukambica* Chodat.

Polygala melilotoides Chodat var. major Bak. fil. Annua, humilis; *foliis* quam iis typi majoribus ellipticis vel oblongo-ellipticis basi in petiolum brevem attenuatis; *racemis* densis multifloris; sepalis inæqualibus superiore multo majore, alis inæquilateraliter orbiculari-obovatis; *carina* angusta apice cristam parvam ferente; *capsulis* alatis; *seminibus* ovoideis lucidis, carunculæ lobis brevibus circa tertiam partem longitudinis seminarum attingentibus.

Belgian Congo, Elisabethville; n. 10887. In flower May, 1914.

Folia 2·5–4·0 cm. longa, 12–20 mm. lata, petiolis 2–3 mm. longis. Racemi 1–2·5 cm. longi. Sepala ± 1·5 mm. longa. Alæ ± 3 mm. longæ. Capsula ± 2 mm. longa, ± 2·5 mm. lata.

Differs from the type by the much larger leaves, and slightly larger flowers, and by the lobes of the caruncle being subequal in length.

Thespesia Rogersii, sp. nov. *Ramis* teretibus cinereo-tomentosis deinde glabrescentibus; *foliis* longiuscule petiolatis late cordatis 3–4 lobis (lobis brevibus rotundatis) 7-nervibus coriaceis utrinque sicut petioli præsertim vero pag. inf. stellato-tomentosis; *floribus* pedicellis tomentosis sat validis calyci æquilongis fultis; *bracteolis* ——; *alabastris* extus tomentosis; *calyce* irregulariter distanterque undulato-dentato dense tomentoso; *columna staminea* apice squamis lineari-lanceolatis prædita; *stigmate* 5-sulcato.

Rhodesia. Bulawayo; n. 5839.

Foliorum limbus 5–6·5 × 5·5–7 cm., in sicco brunneo-viridia subtus pallidiora; costæ pag. sup. planæ, pag. inf. eminentes; petioli 3–5 cm. long. Pedunculi fere 1·5 cm. long. Calyx circa 1·5 cm. long. Petala 5 cm. long. Columna staminea 2 cm. alt., hujus squamæ 4–6 mm. long. Stigma 5 mm. diam.

Apparently conspecific with this is a Bulawayo plant (*Eyles*, 1196) in the British Museum. This the collector notes as a tree 15–20 feet high with flowers varying from yellow to purple. The

leaves of this specimen are longer than those of Archdeacon Rogers's, being up to 9 × 10 cm. and never more than 3-lobed.

In all probability to be referred here, too, are Victoria Falls; *Rogers*, 5389 and *Allen*, 277, both at Kew.

Scabiosa transvaalensis, sp. nov. Herba perennis; *caule* elato erecto simplici vel sursum rariramoso puberulo; *foliis* basin caulis versus haud vel summum leviter confertis oblongo-oblanceolatis vel oblongo-obovatis obtusis sessilibus basi plane vel minime angustatis margine subæqualiter dentato-serratis superioribus basi pinnatifidis segmentis lineari-oblongis obtusis summis perpaucis integris vel subintegris omnibus membranaceis utrobique puberulis; *capitulis* parvis depresse globosis in corymbum longum laxum oligocephalum dispositis; *involucri* phyllis inter se liberis subuniserialibus lineari-lanceolatis obtusiusculis subtiliter appresse sericeis; *receptaculi paleis* linearibus involucello longioribus; *involucelli* setosi limbo undulato; *calyce* obscure denticulato setis 5 fuscis scabriusculis multoties breviore; *corollæ* tubo subcylindrico extus pubescente limbo inæqualiter 4-lobo; *staminibus* 4 exsertis.

Transvaal, Pilgrim's Rest; nn. 14361, 14999; also Spitzkop; *Wilms*, 619.

Folia pleraque 7–8 × 1·5–2 cm., superiora 4–6 × ·5–1·5 cm., summa tantum usque 2·5 cm. long., omnia in sicco viridia subtus pallidiora. Inflorescentia profecto evoluta summum 35 cm. long. sed sæpe brevior. Capitula 8 × 12 mm. Involucrum 6 mm. long.; receptaculi paleæ 2–2·5 mm. Calyx (limbus) ·2 mm. long.; seta 3 mm. Corolla 6 mm. long. Ovarium anguste turbinatum, 1 mm. long.

The almost evenly only toothed and scattered (not rosulate) leaves enable this to be recognised easily.

Helichrysum (*Eu-Helichrysum* § *Obvallata*) **laneum**, sp. nov. Verisimiliter perennis; *caulibus* ascendentibus copiose foliosis uti folia tegmento lanato-tomentoso obtectis; *foliis* sessilibus spathulatis obtusis caulem fere vel omnino obtegentibus; *capitulis* heterogamis circiter 60-flosculosis ad apicem ramulorum brevium solitariis paucisve confertis; *involucri* campanulati phyllis 5-serialibus extimis lineari-lanceolatis ceteris lanceolatis appendice ovata acuta demum radiante rosea apice equidem cæsia onustis; *receptaculo* plano: *flosculis* inclusis paucis extimis femineis; *corolla* superne levissime ampliata limbo breviter 5-lobo; *antheris* breviter caudatis; *styli* ramis truncato-capitellatis; *achæniis* cylindricis papillosis; *pappi* setis paucis scabriusculis albis.

S. Africa, Laingsburg; n. 16760.

Folia plerumque 5–8 × 1·5–2 mm. Capitula 6 × 5 mm. Involucri phylla extima 2·5–3 mm., cetera 4–4·5 mm. long. Styli rami 1 mm. long. Achænia adhuc valde cruda ·7 mm. long., pappus 4 mm.

Near *H. leptolepis* DC. but different, *inter alia*, in the heterogamous heads with a much greater number of florets.

Senecio (§ *Annui*) **latilobus**, sp. nov. *Caule* ascendente sat tenero prolixo bispithameo superne rariramoso a basi subsparsim folioso leviter scabriusculo; *foliis* ambitu late oblongis obtusis pinnatifidis (segmentis ovato-oblongis obtusissimis vel obtusis) sat longe-petiolatis summis paucis sessilibus necnon amplexicaulibus omnibus leviter scabriusculis; *capitulis* parvis heterogamis radiatis pedunculatis in corymbum brevem oligocephalum ordinatis; *pedunculis* propriis gracilibus involucra excedentibus æquantibusve perpaucibracteatis fere omnino glabris; *involucri* campanulati glabri phyllis 13 lanceolato-oblongis acutis apice leviter barbellatis margine anguste scariosis additis calyculi 3–4 multo brevioribus; *ligulis* 8 aurantiacis; *disci* flosculis 28 haud exsertis; *styli* ramis truncatis penicillatis; *achæniis* adhuc valde crudis cylindricis glabris; *pappi* setis scabriusculis albis.

Cape, Tulbagh Road; n. 17051.

Folia in sicco læte viridia, usque 5 cm. long. (petiolo circa 2 cm. long. exempto), inferiora vero breviora; segmenta pleraque 5—fere 10 mm. long., 4–5 mm. lat. Inflorescentia exemplarii unici nobis obvii 2·5 cm. long. Pedunculi proprii 5–10 mm. long. Involucrum 5 mm. long.; calyculi phylla apice fusca, 1·5 mm. long. Ligulæ lineari-oblongæ, 5 mm. long. Disci corollæ 5-meræ, infundibulares, 2·5 mm. long. Styli rami ·6 mm., achænia 1 mm., pappus 2·25 mm. long.

Known by the prolix habit and the relatively large pinnatifid leaves.

Senecio Johannesburgensis S. Moore var. DENTATUS, var. nov. Folia inferiora dentata haud pinnatifida. Ceteroquin ut in typo.

Transvaal, Volksrust; n. 19007.

The affinity of this would seem to be with *S. hieracioides* DC. of § *Polyrrhizi*, not with *S. consanguineus* DC. as stated in Journ. Bot. xli. 401 in the absence of a specimen showing the root-system.

Senecio (§ *Oliganthoidei*) **latissimifolius**, sp. nov. *Caule* simplici ascendente valido ex rhizomate valido foliorum reliquiis imbricatis onusto oriente; *foliis radicalibus* sessilibus elongatis spathulato-obovatis apice rotundatis nonnunquam emarginatis inferne longe extenuatis basi araneosis alibi glabris vel summum leviter puberulis margine late dentatis vel dentato-undulatis tenuiter membranaceis; *foliis caulinis* obovato-subpanduriformibus apice rotundatis basi late amplexicaulibus margine dentatis ima basi araneosis ceterum glabris; *capitulis* submajusculis heterogamis radiatis in corymbum elongatum polycephalum bracteatum digestis; *bracteis* inferioribus foliis caulinis similibus sed plane minoribus intermediis lineari-lanceolatis superioribus linearibus summis perpaucis in calyculi phylla transeuntibus; *pedunculis* propriis involucra facile excedentibus; *involucri* campanulati glabri phyllis 20 oblongis obtusis sursum angustatis apice sphacelatis margine scariosis; *calyculi* phyllis paucis lineari-lanceolatis apice barbellatis quam involucrum multo brevioribus; *ligulis* 9 flavis; *disci* corollis circa 70 5-meris breviter exsertis; *styli* ramis truncatis penicillatis; *achæniis* cylindricis 5-costatis sericeis; *pappi* setis scabriusculis albis.

Transvaal, Pilgrim's Rest; n. 14946.

Planta trispithamea. Caulis circa 5 mm. diam., eximie striata. Folia radicalia 15–24 cm. long., apicem versus fere 6 cm. lat. Folia caulina 13–18 × 7·5–9 cm., superiora vero minora. Inflorescentia circa 20 cm. long. Bracteæ inf. 3–6 × 2–3 cm., summæ gradatim usque ad vel ultra 5 mm. reductæ. Pedunculi proprii plerique 1·5–3 cm. long. Capitula pansa 10 × 14 mm. Involucra 8 mm. long. Ligulæ late oblongæ, apice 3-dentatæ, 12·5 mm. long. Disci corollæ infundibulares, 7 mm. long. Genitalia brevissime exserta. Styli rami 1 mm. long. Achænia 2·5 mm., pappus 6 mm. long.

The chief points about this fine plant are the large, broadly stem-clasping cauline leaves together with the araneose clothing at the base of both kinds of leaves and the largish flowering heads. It would appear to be nearest the Abyssinian *S. subsessilis* O. & H.

Senecio (§ *Kleinoidei*) **abbreviatus**, sp. nov. Planta glabra, *caule* decumbente hac atque illac radicante sparsim folioso; *foliis* in ramulis inter se satis distantibus brevissimis gemmasque revera referentibus aggregatis sessilibus ovato-oblongis obtusis apice mucronulatis carnosulis; *capitulis* heterogamis radiatis ∞-flosculosis solitariis terminalibus longipedunculatis pedunculis bracteis paucis parvulis onustis; *involucri* cylindrico-campanulati phyllis 8 oblongis sub apice angustatis apice sphacelatis leviterque barbellatis; *ligulis* circa 8 flavis; *disci* flosculis circa 30 5-meris longe exsertis; *styli* ramis truncatis penicillatis; *achæniis* (immaturis) oblongis compressis 4-costatis dense sericeis; pappi setis scabriusculis albis.

Cape, Worcester Division, between Osplaats and Tunnel sidings; n. 16430.

Folia longit. interdum 1 cm. æquantia vel paullo excedentia, plerumque ± 7 mm. long., 3·5–5 mm. lat., in sicco olivaceo-grisea. Pedunculi 4–6 cm. long.; horum bracteæ subulatæ, ± 2 mm. long. Capitula pansa 15 × 13 mm. Involucri phylla 11 mm. long. Radii corollæ in toto 19 mm. long., ligulæ anguste oblongæ. 9 mm. long. Disci corollæ anguste infundibulares 15 mm. long. Styli rami 3 mm. long. Achænia 3 mm., pappus 15 mm. long.

On a cursory view this might be supposed a short-leaved form of *Kleinia radicans* DC.; the radiate heads and truncate penicillate style-arms remove it from *Kleinia*.

Gazania Rogersii, sp. nov. Perennis, subacaulescens; *caulibus* cæspitosis validis plurifoliosis; *foliis* omnibus pinnatisectis araneosis segmentis sat distantibus sæpius 5–7 ovatis vel oblongo-ovatis obtusis integris vel 1–2-lobatis; *scapis* folia excedentibus adæquantibusve inferne araneosis vel omnimodo fere glabris; *involucro* campanulato-turbinato basi truncato-cupulato araneosoque alibi leviter araneoso phyllis 3-serialibus quam tubus brevioribus lanceolatis acutis vel obtusis intimis nigro-marginatis; *receptaculo* convexo; *ligulis* 10 longe exsertis aurantiacis; *disci* flosculis inclusis; *styli* ramis linearibus obtusis; *achæniis* turbinatis longe villosis.

Cape, Oudtshoorn; n. 17008.

Folia 7 cm. attingentia sed sæpissime ± 4 cm.; segmenta ± 5 mm. long. Scapi ± 6 cm. long. Involucri tubus 7–8 × 4–5 mm.; phylla extima 3 mm., intima 5 mm. long. Ligulæ oblongæ, bidentatæ, 16 mm. long. Disci corollæ 7 mm. long. Achænia (cruda) 1 mm long.

Pappi squamæ difficillime secernendæ, verisimiliter angustissimæ, erosæ et circiter 4 mm. long.

To be compared with *G. Lichtensteinii* Less. which has obovate-spathulate entire or at most lobed spinulose-ciliate leaves, heads without the basal cup and a somewhat different involucre.

Wahlenbergia gracillima, sp. nov. Planta glabra, saltem spithamea; *caule* gracile sursum ramuloso ramulis foliosis; *foliis* parvulis linearibus obtusiusculis integris vel microscopice denticulatis primo ex ramulis novellis ortis imbricatis dein sparsis; *floribus* parvis ad apicem ramulorum solitariis vel perpaucis racemoso-cymosis pedicellis filiformibus folia excedentibus æquantibusve insidentibus; *ovario* 3-loculo hemisphærico quam calycis segmenta lineari-lanceolata microscopice denticulata paullulum breviore; *corolla* tubulosa tubo calycem facile excedente lobis ovatis acutis tubo brevioribus; *stigmate* breviter exserto 3-ramoso.

Transvaal, on the Selati Ry. between Komati Poort and Letaba River, alt. 1000–2000 ft.; n. 2684.

Folia plerumque 1·5–4 mm., summum ·25 mm. lat. Pedicelli circa 4 mm. long., horum bracteæ foliis summis similibus, 1·5 mm. long. Ovarium 1 mm. long., calycis segmenta 1·5 mm. long. Corollæ tubus 3·5 mm. long, basi 1·5 mm. lat., sursum 1 mm.; lobi 2·5 mm. long. Stylus 4·5 mm. long.; stigmatis rami 1 mm. long.

Besides the corolla above described there was found on one of the specimens a flower with campanulate corolla, its tube 2 mm. wide at the base gradually widening to 3 mm. at the throat. The stigma of this flower is 4-armed.

In habit this is a good deal like *W. ramulosa* E. Mey., but the imbricate leaves on the young branchlets give it a somewhat different appearance. The corolla of *W. gracillima* is at least twice as long as that of the other species.

Cyphia Rogersii, sp. nov. *Caule* volubili gracili tereti glabro sparsim distanterque folioso; *foliis* breviter petiolatis lanceolatis vel plus minus anguste lanceolato-linearibus apice mucronulatis basi acutiusculis margine minute subdistanter denticulatis membranaceis glabris; *racemis* terminalibus elongatis plurifloris floribus inter se sat remotis; *bracteis* filiformibus pedicello brevioribus; *calycis* maxime abbreviati glabri lobis a corolla magnopere superatis anguste oblongis obtuse acutis margine sæpe minute denticulatis; *corollæ* extus glabræ petalis ima basi connatis inferne liberis superne connatis lobis oblongis obtusis anticis paullulum altius solutis; *ovario* fere omnino supero; *stylo* crasso; *stigmate* oblique clavato.

Transvaal, Pietersburg Division, Modjadjes; n. 18212.

Folia sæpe 5–6 cm. long., 3–12 mm. lat., sed interdum minora, in sicco virentia. Racemi absque pedunculo satis longo usque ad 30 cm. long. Bracteæ sæpius 2–4 mm. long.; pedicelli 5–6 mm. Calycis segmenta 2·25 mm. long. Corolla in toto 11·5 mm. long.; tubus 8 mm., lobi postici vix 3 mm., lobi antici 3·5 mm. long., lobi omnes 1 mm. lat. Filamenta breviter barbellata, 3 mm. long.; antheræ 1 mm. long. Ovarium late ovoideum, superne in stylum desinens. Stylus (incluso stigmate) 2·5 mm. long. Capsula subsphæroidea.

sicca 5 × 5·5 mm. Semina maxime complanata, suborbiculata, 2·5 × 2·25 mm. ala circa 0·5 mm. lat. haud exempta.

The chief points about this as compared with *C. Eylesii* S. Moore are the almost entire leaves, the bracts shorter than the pedicels, the minutely toothed calyx-lobes, smaller glabrous corollas with narrower tube, and the very small extent to which the ovary adheres to the calyx.

Jasminum transvaalense, sp. nov. *Ramulis* tenuibus bene foliosis piloso-pubescentibus; *foliis* simplicibus oppositis brevipetiolatis ovatis vel ovato-oblongis apice obtusis ipso apiculatis basi truncato-rotundatis membranaceis utrinque piloso-puberulis subtus in axillis nervorum dense fulvo-pubescentibus; *floribus* sat longe pedicellatis ad apicem ramulorum 1–3-nis; *pedicellis* (uti calyx) pilosis; *calycis* segmentis 4–6 filiformibus quam tubus longioribus; *corollæ* tubo gracili superne leviter ampliato calycem multo excedente lobis 7 (anne semper?) lanceolatis acuminatis tubo brevioribus; *staminibus* juxta medium tubum affixis; *stigmate* oblongo.

Transvaal, Pietersburg Division, Modjadjes; n. 18108.

Folia usque ad 3·5–4 × 2–2·5 cm., sed sæpe minora e. g. interdum modo 1–1·5 cm. long., in sicco læte viridia; petioli 1–2 mm. long., pubescentes. Pedicelli circa 1 cm. long. Calycis tubus anguste campanulatus, 1·5 mm. long., hujus segmentis 3–4 mm. long. Corollæ tubus 19 mm. long.. inferne 1 mm. diam. vel paullulum ultra, ad fauces 2·5 mm.; lobi 12 mm. long. Antheræ apice aristatuliferæ, 5 mm. long. Ovarium subquadratum, compressum, apice pilosulum, 1 mm. long. Stylus basi pilosulus, ceterum glaber. 11 mm. long.; stigma 6 mm. long.

Among South African species nearest *J. streptopus* E. Mey. from which it is to be distinguished chiefly by the indumentum, the longer and narrower lobes of the calyx and the corolla with shorter tube and lobes.

Lindernia tenuis, sp. nov. Annua, humilis (summum 10 cm. alt.), a base crebro ramosa, glabra; *ramis* tenuibus distanter foliosis; *foliis* sessilibus oblongo- vel lineari-lanceolatis obtusis integris vel sparsissime denticulatis; *floribus* subsessilibus in racemos terminales graciles simplices vel leviter paniculiformes folia longe excedentes ordinatis; *bracteis* exiguis subulatis pedicellos paullulum superantibus; *calycis* triente sup. in lobos subulatos acutos divisi tubo 5-costato costis sat prominulis; *corollæ* tubo calycem excedente infundibulari labio postico breviter bifido margine microscopice denticulato labii antici lobis inter se subæqualibus oblongo-obovatis obtusissimis; *filamentis* anticis appendice subglobosa glabra onustis antheris mox liberis; *capsula* calyce breviori oblongo-ovoidea obtusa glabra.

Belgian Congo, Elisabethville; n. 10886.

Folia inferiora circa 10 mm. long., superiora (summa sæpe anguste linearia) 5–7 mm., illa 2–3 raro 4 mm. lat. Racemi usque ad 7 cm. long., plerique vero breviores. Bracteæ ± 1 mm. long.; pedicelli ·5 mm. Calyx 3·5 mm. long.; lobi soli 1 mm. paullulum excedentes. Corollæ tubus 5 mm. long.; ore 3·25 mm. lat.; labium

posticum fere 3 mm. long.; anticum 4·5 mm.; hujus lobi 2·5 mm. long. Filamenta antica arcuata, fere 3 mm. long.; appendix ·3 mm. diam.; antheræ ·4 mm. long.; filamenta postica 1 mm. long. Ovarium 1·5 mm., stylus 4 mm. long., hic superne leviter incrassatus. Capsula 3 × vix 2 mm.

The copiously branching slender habit, broad lower leaves, subsessile flowers and short narrow lobes of the calyx are the chief peculiarities of this very distinct species.

(To be continued.)

NOTES SUPPLEMENTAL TO THE FLORA OF BRISTOL.

By J. W. White, F.L.S.

During the period that has elapsed since the publication of my book, some excellent additions—expected and unexpected—have been made both to the numbered list of accepted species and to the localities recorded for scarce plants; while a few systematic and structural matters of more or less interest in relation to the district flora have claimed attention. The discoveries herein mentioned will raise the number of species (other than aliens) included in the *Flora of Bristol* to a total of 1200.

A good deal of the information here given has appeared from time to time in the *Proceedings of the Bristol Naturalists' Society*, but the Editor's suggestion that it should be arranged for publication in this Journal was willingly adopted, since, apart from any local value, these notes may have an interest for botanical students.

It will be apparent to the reader that in active field-work the author's personal doings now count for little. This deficiency, however, is of no moment in face of the energetic help given by a succession of loyal friends and correspondents whose kindness is once more gratefully acknowledged.

Anemone nemorosa L. At a meeting of the Bristol University Botanical Club in March last year Mrs. Sandwith exhibited some fine examples of phyllody of stamens in the Wood Anemone found in a numerous colony within the Bristol district. This condition, wherein true leaves are substituted for stamens, is not at all frequent, but according to Dr. Maxwell Masters has been observed not only in *A. nemorosa*, but in other allied species. Present-day views teach us that this is not a retrograde change, but one of progression. In some foreign Anemones transitional forms between stamens and sepals are always present, and there is a section of the genus where two or three of the sepals are entirely green and bract-like. By one more step we arrive at the foliage-like development in Mrs. Sandwith's Wood Anemone.

Ranunculus heterophyllus Weber var. *submersus* Hiern. In *Fl. Brist.* I record the occurrence of this plant in brackish water near Lawrence Weston, G. Last year Miss Roper forwarded some sheets of it from that locality to the Bot. Exch. Club, and Messrs. Hiern and Wheldon reported that these represent *R. trichophyllus* Chaix. I cannot accept the opinion, but adhere to that expressed by Mr. Groves on the same specimens that they were correctly labelled; "the flowers being too big, the leaves too distant, and the whole plant on much too large a scale for any form of *trichophyllus* that I have seen."

? *R. peltatus* × *trichophyllus*. Good examples of this rare hybrid, as I judge it, were obtained from a pond on Brimscombe Farm between Chipping Sodbury and Wickwar, where only the supposed parents accompanied it. Mr. Groves saw a series of specimens and agreed with my suggestion, the *peltatus* plant being in his opinion nearest that form of the aggregate usually referred to *R. floribundus* Bab., while the *trichophyllus* was typical. My attention was especially attracted to a character possessed by this hybrid and shared by similar crosses as we find them about Bristol—namely, the erect, weak, barren peduncles. After flowering these often remain upright and nearly parallel with the stem. I venture to regard this peculiarity as in itself strong evidence of hybridity, stronger even than the undeveloped carpels which are sometimes abortive from other causes. Messrs. Hiern and Wheldon, who have lately seen this plant, do not agree with us, and incline to name it a form of *heterophyllus*.

R. floribundus Bab. G. In the pond on Brimscombe Farm mentioned above, with a presumed hybrid, and in several old strontia (celestine) pits (now ponds) south of Hall End. In one of these ponds the plant bore flowers with 6, 7, 8, 9, and 10 petals—the only instance known to me of such an occurrence amongst the Water Buttercups.

R. Drouetii F. Schultz. G. Ditch (or rivulet) bounding Yate Lower Common on the south; June 1916.

R. Lingua L. In 1865 Mr. T. H. Yabbicom gathered this on Walton Moor by Clevedon and placed a specimen in charge of the Bristol Naturalists' Society. So far as is known, the plant was not again noticed in that locality until 1914, when it was re-discovered by the Misses Cundall in a peaty ditch, well choked with vegetation, a short distance west of Clapton-in-Gordano Church. There was a fair quantity, extending about 100 yards, but when that ditch in turn is dug out and cleared another long period of scarcity will probably follow.

The small patches of *R. Lingua* that occur in the Bristol district are separated from each other by wide intervals. It is a species that does not spread or scatter itself over large areas even when the surrounding ground appears identical in every respect. Thus, on the great expanse of peat-moor between Highbridge and Glastonbury this plant grows only in one place where in 1915 there seemed to be no more and no less of it than there was forty years ago. The primordial submerged or seedling leaves of this species, produced in the first weeks of spring, appear to be very little known, and are seldom mentioned by botanical writers. The earliest leaves of seedling plants are subrotund, cordiform, about two inches in diameter. Those that succeed, while larger, more elongate and entire at the base, are still broad and blunt, their texture being membranous and semi-transparent. It is not until the stem becomes aerial that long, narrow, lanceolate and coriaceous leaves are produced; and by that time the early submerged leaves have decayed and disappeared. Bauhin (1623) and Parkinson (1640) are among the few that refer to the peculiarity here described. Bromfield (1856) gives an accurate account in his *Flora Vectensis*, and in 1886 Mr. F. C. S. Roper of Eastbourne read a note on the subject before the Linnean Society (see Journ. Linn. Soc. xxi. 380).

R. sardous Crantz (*R. hirsutus* Curtis). In *Rep. Watson Exch. Club*, 1914–1915, Mr. A. J. Wilmott comments on a plant collected by Miss Roper in the mill-yard by Portishead Dock. S., and gives reasons for believing her specimens to belong to the closely-allied *R. trilobus* Desf., an alien species from the Mediterranean region, in which the carpels are tubercular all over both faces, not merely with a marginal ring of slight tubercles as in *R. sardous*. An examination of my own examples from Bristol rubbish-tips and waste ground reveals that some of them also are really *R. trilobus*. For a positive identification of these plants it is necessary to have them in good fruit.

Helleborus viridis L. G. One large clump in an old orchard on Mitchell's Farm, Hallen Marsh, 1914! *Miss Roper*. Several on a laneside near Bury Hill, north of Yate, and two fine ones in pasture on the other side of the hedge, 1916! *Miss Roper*.—S. For some yards on the edge of woodland above Clapton Court, 1916! *Misses Cundall*. Four or five clumps in underwood at the base of Lyncombe Hill! *Miss Roper*. No wilder spot could be imagined.

In *Journ. Bot.* 1915, 113, Miss Roper enquired if anything was known of a form of Green Hellebore having sepals blotched with purple at the base. She had noticed such plants in plenty at Winterhead-on-Mendip, but in no other Bristol station for the species. In reply Mr. C. E. Salmon reported one such occurrence in Surrey; and Mr. Britten stated (*loc. cit.* 147) that none of the numerous specimens in the British Herbarium, S. Kensington. showed the peculiarity: nor is it mentioned in any available descriptive flora.

H. fœtidus L. G. Wood by the Gloucester road, south of Ridgeway, about 20 plants, 1915! Sparingly on the Hollywood estate!—S. South side of Wavering Down above Compton Bishop; plentiful, and conspicuous at a long distance when in flower; *Dr. Wiglesworth*.

Aconitum Napellus L. In *Fl. Brist.* 131, I quote an article on Bristol Pharmacology, published in 1871, by the late W. W. Stoddart, F.L.S. The author wrote of Aconite as growing luxuriantly at that date in Glen Frome near Stapleton G., and as no other mention of the plant's existence in the locality had come under notice it was hinted that Mr. Stoddart's experiments on the roots may have made an end of the colony. In June 1914, nearly half a century later, Mr. W. H. Pullin conducted me to a steep wooded bank above the Frome where at least a dozen plants were flowering. Although we could not recognize that any planting had been done in that part of the domain, Mr. Stoddart was no doubt right in believing the Glen Frome Aconite to have been originally introduced.

Castalia speciosa Salisb. The late Dr. H. O. Stephens was not accustomed to date his specimens, but we know that the White Water-Lily from Tickenham Moor S. in his herbarium would not have been gathered later than 1870. In the years that followed I do not remember that anyone remarked the plant's presence on the moor. It is still there, however, in one of the main rhines, as reported (1914) by Mr. F. Samson.

Meconopsis cambrica Vig. S. Callow Rocks on Mendip. First recorded thence by Mr. F. Samson in *Proc. Bristol Nat. Soc.* for 1912.

[*Rœmeria hybrida* DC. G. Six or eight plants on a fowl-run at Baptist Mills, 1913! *Ivor W. Evans.* On made ground, St. Philip's Marsh, 1913–1916! S. Dustheap, Portishead, 1914! *Mrs. Sandwith.*]

[*Hypecoum procumbens* L. Casual by Portishead Dock, May 1907! *Miss Livett.*]

Fumaria pallidiflora Jord. S. Corner of churchyard, Axbridge, 1912! Burnham; *Watson* in *Journ. Bot.* 1917, 180. The Axbridge roadside plant (*Fl. Brist.* 139)—the churchyard colony appears to be the same—has since been determined as his var. *Babingtonii* by Mr. H. W. Pugsley.

F. Boraei Jord. Referring to the single specimen found by Mr. Bucknall on the Frome bank and my note thereon in *Fl. Brist.*, it is of interest to learn that Miss Roper in 1915 observed a good quantity of this Fumitory on the border of a cornfield at Nibley, G., not far from a rivulet that drains into the Frome above the spot where Mr. Bucknall's plant was detected.

Barbarea arcuata Rchb. In *Fl. Brist.* I mention a peculiar form of Yellow Rocket with spreading arcuate pods gathered many years ago in a marsh by Stapleton G. At the time no botanist consulted could definitely place it, but after thirty-five years the point was settled by the receipt of a specimen of *B. arcuata* authenticated by M. Brébisson and by a note from Mr. A. Bruce Jackson, who writes:—"This is no doubt typical *B. vulgaris* var. *arcuata* Rchb., which Reichenbach described as a species." The Stapleton plant has entirely disappeared.

["*Arabis alpina* L." *Fl. Brist.* p. 145. Mr. Druce informs me that he finds the specimen in Herb. H. C. Watson to be labelled "Whitehall" not "White House" as written by Banks. This makes the locality clearer, Whitehall being a district of East Bristol. Mr. Druce thinks the plant gathered was probably *A. albida.*]

Hesperis matronalis L. Several plants in woodland on Claverton Down, Bath; June 1913!

Sisymbrium officinale Scop. var. *leiocarpum* DC. G. In plenty by the side of a grassy track on Ivory Hill. The two forms were growing together; the variety could be recognized at once by its paler and greener tint, the type being somewhat hoary and at length purplish-brown.—S. On made ground near Arno's Vale, 1912! Uphill village, 1917; *Noel Sandwith.*

[*S. Irio* L. By unfortunate oversights this alien was omitted from the *Flora.* When I gathered it in St. Philip's Marsh in 1904 it was mistaken for *S. Columnæ*, and Miss Roper forgot to mention that she had it in her herbarium from Portishead Dock in 1909. I am not aware that it has been seen since. *S. Columnæ* is quite a frequent casual on fowl-runs and city refuse. In both species the young pods exceed the flowers, and the foliage is very similar. One or two uppermost leaves of *S. Columnæ*, however, are usually entire, while those of *S. Irio* are all divided, and the fruit pedicels of the latter are twice as long as and more slender than those of the other. In both species they are many times shorter than the pods.]

[*Brassica Pollichii* Sch. & Sp. Alien. Field by Yanley Lane, Long Ashton, 1916! *Miss Roper.*]

[*Alyssum alyssoides* L. G. Plentiful on a newly metalled accommodation road below Lawrence Weston, 1915; in still larger quantity the year following! *Miss Roper.*]

[*A. incanum* L. G. St. Philip's Marsh, 1913! The Filton Estate, 1913; *Miss Roper.*—S. Railway bank by Brislington Station, 1915! *H. S. Thompson.*]

Cochlearia officinalis L. Rocks just below the Water Works, Blagdon, Mendip, on dolomitic conglomerate; *H. S. Thompson.*

C. danica L. Six plants on a low cliff by the Nore, Portishead, 1912; *Miss Livett.*

[*Lepidium neglectum* Thellung. G. With seeds larger than those of *L. ruderale* and narrowly bordered. St. Philip's Marsh, *G. C. Druce.*—S. On mule camps at Webbington and by Yanley Lane, Long Ashton, 1816! *Miss Roper.*]

[*Bunias Erucago* L. Alien. By Portishead Dock, 1906! *Miss Livett.*]

Reseda lutea L. var. *gracilis* Rchb. non Tenore (var. *pulchella* J. Muell.). G. Colonist or alien on made ground in several parts of St. Philip's Marsh.—S. about the Dock and railway-sidings at Portishead. Fruit very papillose.

Viola palustris L. forma *alba*. On Mendip, April 1914! Hitherto on record only from Killarney (Gregory, *Brit. Violets*); and from W. Inverness, *W. D. Miller.*

V. odorata L. var. *præcox* Greg. G. Almondsbury Hill, Nov. 1916!—S. Between Pensford and Stanton Drew, 1903! *F. Cundall.* Tickenham Hill, Jan. 1915! *Miss Roper*: specimen submitted to Mrs. Gregory.

V. Riviniana Rchb. Miss Roper's notes for 1915 comprise (*fide* Mrs. Gregory):—forma *minor* Rowberrow Warren and King's Wood, Yatton, S.; forma *nemorosa* Beech Wood, Lansdown, G.; var. *diversa* Milbury Heath near Tytherington, G., and Walton-in-Gordano, S.; × < *silvestris* Cadbury Lane near Clevedon, S.

V. lactea Sm. For the discovery of this species and a hybrid, see *Journ. Bot.* 1917, 227.

Silene Cucubalus × *maritima*. This hybrid, recorded from the Mendips years ago by the Rev. E. F. Linton (*Fl. Brist.* 185) has been lately gathered in that district by Mr. Britten, "together with a small *S. maritima*, which fairly well answers to the description of var. *parvifolia* Druce"; *Marshall* in *Journ. Bot.* 1917, 181.

S. noctiflora L. S. Waste ground, Clevedon, Oct. 1914! *Rev. E. Ellman.* Cornfield, Walton-by-Clevedon, 1917! *Id.*

Sagina nodosa Fenzl. Very sparingly in three localities on Mendip, viz. Charterhouse, *Miss Roper*. Burrington Ham, *H. S. Thompson*. Shipham Bottom, *C. Bucknall.*

Arenaria serpyllifolia L. var. *viscidula* Roth. (*glutinosa* Koch). Mr. Marshall records this from sandhills north of Burnham and at Berrow. Mr. H. S. Thompson finds it in fine state on the coast to the south of Burnham and on Purn Hill, Bleadon. He tells me that Thos. Clark's specimens from Steep Holm (1836) and from "Burnham sand-tolls" (1836) come under this variety.

Stellaria palustris Retz. S. Nailsea Moor. extending a few yards, 1913! *Miss Roper.* The non-glaucous form, with intermediates, on peat near Edington Junction, new to the county; *W. Watson.* The species is very variable. See C. E. Moss in *New Phytol.* 1912, 399.

Cerastium arvense L. Abundant in a rough hillside pasture near Axbridge, two patches on and about exposed rocks, where the plant must be undoubtedly native. 1915! *H. S. Thompson.* On Lansdown, not far from the Grenville Monument, over a considerable area; 1915! *Mrs. Reginald Price.*

Spergularia rubra Pers. Two plants on Yate Common, G. 1914; and several there in 1916; *C. Bucknall.* On a dry pennant bank by the G.W.R. north of Keynsham, S. 1915! *C. Bucknall.* New to N. Somerset.

Scleranthus annuus L. G. In plenty for some yards on Bury Camp near Moorend, July 1912!

Althæa officinalis L. S. On the shore between Portishead and Clevedon, 1915; *Rev. E. Ellman.* Banks of the Brue at Meare, 1912! One plant near Berrow, 1916; *J. W. Haines.*

A. hirsuta L. Casual in St. Philip's Marsh G. One plant in 1915! *C. E. L. Gardner.* Several there, 1916; *The Misses Cobbe.* Still in Miss Peck's locality at Portishead, S. 1915; *Miss Roper.*

Hypericum elodes L. In June 1914 the late Canon Ellacombe showed me his note, written in August 1878, of finding *H. elodes* in the small bit of bog near Mangotsfield. He had thus anticipated C. Withers by 14 years. In August 1914 I at last saw this plant on the N. Somerset peat-moor—masses of it in an old turf-cutting within two miles of Glastonbury Tor.

Geranium phæum L. S. In a hedge nearly opposite the entrance to Combe Lodge, Blagdon, 1916; *J. Westbrook.* Hedgebank in Rickford Combe, Blagdon, 1917; *H. S. Thompson.*

[*G. nodosum* L. Now grows abundantly about the ruins of Begbrook House, Frenchay!]

G. pusillum L. S. In unusual plenty about exposed rock on Cadbury Hill, near Yatton, 1916. A cool wet spring had been favourable for small herbaceous plants on thin soil.

G. Robertianum L. var. *purpureum* Vill. The true plant (*genuinum* Rouy) grows on rocks in Leigh Woods. S. First noticed in 1912 by Dr. Moss who thought it identical with one at St. Aubyns, Jersey. That which I have from Newquay, Cornwall, has flowers still smaller—about 6 mm. diam. against 9–10 mm. in Leigh Woods. Dr. Moss suggests (*New Phytol.* 1912, 402) that the Bristol plant may have a hybrid origin—× *lucidum.*

Erodium moschatum L'Hér. G. Casual on Wapping Wharf, Bristol Harbour, 1912!, and in St. Philip's Marsh, 1916! *Miss Roper.* —S. Still on Hangstone Hill, Clevedon, 1916! Abundant about quarried ground under the Cadbury range east of Clevedon Court, 1915! About bare rock near Providence, Long Ashton, 1915! *Miss Roper.*

Euonymus europæus L. S. Two small trees by the Malago stream in Crox Bottom, Bishopsworth, bear white fruit. These were first noticed by Mr. F. Samson in 1912, and are the only albino spindle-trees I have met with.

[*Staphylea pinnata* L. Several tall bushes on the bank of a stream to the north of Bishop's Hill Wood, Wickwar, G., at a long distance from any garden; *Capt. Gordon.*]

[*Rhamnus Alaternus* L. A small bush amid hawthorns and brambles on Penpole Point, G.; no other introduced plants being at hand, 1916! *H. S. Thompson.* Of interest as being the second Bristol locality for this alien shrub.]

Ulex Gallii Planchon. "Aug. 26, 1836. Noticed [at St. Vincents Rocks] a *Ulex* that appears to be new. Mr. Forbes said that it exactly resembled *U. provincialis* of the south of France." *Memorials of C. C. Babington*, 57. This was written some thirteen years before the plant was described by Planchon.

Genista anglica L. Yate Lower Common, G., plentiful in two or three isolated bits of the original heathland.

Medicago media Persoon (*M. falcato-sativa* Rchb.). *The Garden* (Sept. 1, 1917) contains an article on "Lucerne and its Colour-Forms" by Mr. H. S. Thompson, who mentions the persistence of this hybrid at Burnham where he first noticed it in 1906.

M. arabica Huds. Border of Cleeve Wood, Hanham, G. for a yard or two, 1916! *A. W. Cottle.* Hillside above Uphill, S. in quantity; *J. W. Haines.* Large patches in the churchyard, Axbridge, 1912!

M. minima L. As a casual sparingly at Newton St. Loe, S.! *Miss Roper.*

Lotus tenuis Kit. Waste ground, Cranbrook Road, Bristol, 1917; *H. S. Thompson.*

Astragalus danicus Retz. Whatever doubt there may have been on the existence of this plant in the district has been dispelled by Mr. H. W. L. Harford of Horton, who sent me specimens in 1912 from two spots, half a mile apart, on Stinchcombe Hill, G.

Vicia Orobus DC. Found by Mr. H. S. Thompson in a new locality—a pasture between Lower Farm and Charterhouse on Mendip, 1915.

Lathyrus Aphaca L. A large plant on waste ground at Shirehampton, G., 1914! *Mrs. Sandwith.* Persistent since 1907 by the Avon near Arno's Vale, S.! An occasional weed at Failand, S.! *Miss Agnes Fry.* Two plants in Mr. Dunn's locality near Twerton, 1914!

[*L. hirsutus* L. On rubbish by the Avon at Brislington, S., 1912!]

Prunus insititia L. Hedgerow between Northwick and the Old Passage, G.; *Mrs. Sandwith.* Failand Hill, S.! Winterhead-on-Mendip; *Miss Roper.* Hillside above Clapton-in-Gordano, S. where, from five or six trees in a hedgerow, two friends and I gathered 55 lbs. of fruit at the beginning of last September, leaving as much more on branches that could not be reached. I suppose there had been some such a fruiting season as this when Turner was moved to write in praise of the Bullaces of Somerset.

Agrimonia odorata Mill. New to the Bristol district. S. Near Charterhouse-on-Mendip; a larger quantity in the hedge of a meadow nearer Blackdown; *H. S. Thompson.* End of a lane near Farrington Gurney; *Id.* The Court Hill above Norton's Wood, Clevedon! *Miss Roper.* Asham Woods, 1917; *R. V. Sherring.*

This handsome plant was thought likely to grow within our borders (*Fl. Brist.* 36) but was not recognized until 1915. The only valid excuse for this failure that I can advance lies in the scanty descriptions given in British books. The characters that separate *A. odorata* from the common Agrimony are mainly of degree, but a constant distinguishing feature of the former is the rounded base—campanulate, not obconic—of the mature calyx which is marked with shallow furrows that do not extend more than half the length. This essential character is unnoticed by English writers. As pointed out by Messrs. Thompson and Bruce Jackson (*Journ. Bot.* 1915, 280, 337) we must go to French, Swiss or Belgian authors for a satisfactory treatment.

Potentilla argentea L. G. On sandstone at Longwell Green, Hanham; and a single plant at Mr. Fry's old station for *Filago minima* in the same parish, 1917; *Miss Roper.*—S. A large patch by the sidings at Portishead Station, 1912! The leaflets being narrow and deeply cut Mr. Marshall believed it to be the var. *tenuiloba* Jord. In several places on a rocky slope under the Cadbury range near Tickenham, looking like a native though on limestone! *Rev. E. Ellman.*

Rubus affinis W. & N. var. *Briggsianus* Rogers. Burtle Moor, S. 1910; *Rev. A. Ley.*

R. incurvatus Bab. Hedgerow on the peat near Edington, S. 1914! *Mr. Metcalfe Day.* Named by Rev. W. Moyle Rogers.

R. Godroni Lecoq & Lamotte. Rowberrow Bottom, Mendip, 1916; *Miss Roper.* "*R. Godroni* aggr., not quite *robustus*"; *H. J. Riddelsdell.* "I agree in putting this under our difficult aggregate *Godroni*"; *W. Moyle Rogers.*

R. lasiocladus Focke, var. *angustifolius* Rogers. Durdham Down, Bristol, G. Once found by Mr. Riddelsdell in the Gully. Now conspicuous on a portion of the open Down, and in this instance less suggestive of hybridity than is often the case with plants of this aggregate.

R. Drejeri G. Jensen, var. *Leyanus* Rogers. S. Peat moor, Shapwick, 1889; *H. S. Thompson.* Worle Wood, 1902; *A. Ley* ex *Marshall* in Fl. Som. Suppl.

R. ericetorum Lef. Worle Wood, S.; *A. Ley.* Var. *cuneatus* Shapwick Bog; *A. Ley* ex *Marshall* in Fl. Som. Suppl.

Geum rivale × *urbanum.* In a hedge-bottom near the Blue Bowl between Chew Stoke and Compton Martin; *Miss Roper.*

Rosa arvensis Huds., var. *erronea* Rip. & Crèpin. With smooth peduncles. Path leading from Keynsham to Hanham Ferry, S. 1916; *Miss Roper.* Confirmed by Mr. W. Barclay.

(To be continued.)

THE RED CURRANT.

By A. J. Wilmott, B.A., F.L.S.

The most recent issue of the *Journal of the Royal Horticultural Society* (Sept. 1917) contains (pp. 260–70) an interesting and careful study of "The History and Development of the Red Currant," by Mr. E. A. Bunyard on the lines of the equally valuable paper on "The History and Development of the Strawberry," printed in the same Journal (xxxix. 541–552, April 1914). Three species are stated to have taken part in the development of the Red Currant. These species have been much confused, and Mr. Bunyard, basing his descriptions on E. de Janczewski's *Monographie des Groseilliers* (Mém. Soc. Phys. Hist. Nat. Genève, vol. xxxv. 1870) thus differentiates them:

"*Ribes vulgare* Lamarck, 1789.—Native of Western Europe, France, Belgium. Great Britain. A small spreading shrub, leaves 3 or 5-lobed, slightly downy beneath in some forms; flowers flat, pale green; sepals turning back; petals minute, wedge-shaped. The fleshy ring round the style is a good character by which this species can always be recognized, and even in crosses with *Ribes rubrum* it can still be distinguished. The racemes are pendulous. Buds small, dark brown, fairly closely pressed to the twig . . . . .

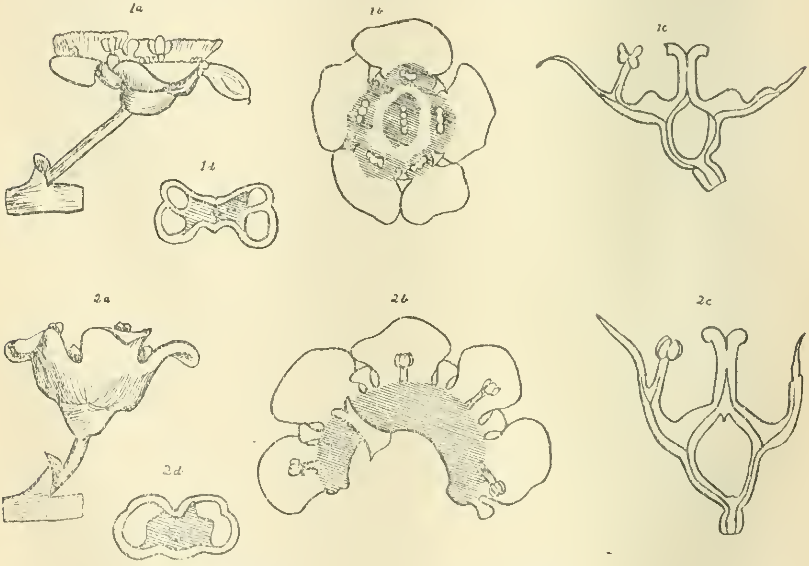
"*Ribes rubrum* Linnæus, 1753. Central and Eastern Europe and Asia, Scandinavia, Poland, Prussia, Russia, Siberia, and Manchuria. A small bush, leaves rounded, 3 to 5-lobed, generally densely pubescent. Flowers bell-shaped, pale green or reddish, racemes held horizontally till fruit develops and weighs them down. Buds small, generally covered with white hairs, a little away from wood. This species is easily distinguishable when in flower. The campanulate flowers are held out at right angles from the stem in contradistinction to the pendulous flowers of *R. vulgare*. The absence of a disc upon the receptacle is also constant. . . . .

"*Ribes petraeum* Wulfen 1781. High mountains of Europe, North Africa. and Siberia. A very distinct species, making very stout wood, with large buds. Leaves very dark green, stout and firmly held, the middle lobe being always longest. Fruit more or less acid, generally tapering a little to stem, giving a slight Bergamotte shape. Flowers late in the season."

It will be noticed that Mr. Bunyard gives *R. vulgare* as the only British species, although Janczewski (*l. c.* 289) records also for Scotland the var. *pubescens* of *R. rubrum*. This latter is the plant often known as *R. petræum* of Smith (not of Wulfen), which is widely distributed in Scotland and the north of England. By the courtesy of the Royal Horticultural Society we reproduce the figures which illustrate the differences between the two British species, and to which have been appended the names assigned to them in this paper.

I am disposed to agree in separating our British plants into two species, but I find that the names used for them by Janczewski are not in accordance with the International Code. This note is concerned with the nomenclatorial matter.

The common Red Currant was in 1900 separated by Janczewski from the species with horizontal-ascending racemes and named *R. domesticus*. Schneider in 1905 rejected this name, using *R. vulgare* Lamarck (Encycl. iii. 47, 1789), in which he was followed by Janczewski in 1907. But Lamarck, whose diagnosis states that the racemes are pendulous, describes two forms:—α, the wild plant (=var. *silvestre* Rchb. Fl. Germ. Excurs. 562, 1832, and doubtless also of Bromfield Phytol. ii. 519, 1846); and in β the cultivated form (=var. *sativum* Rchb. *l. c.*) for which he cites "*R. rubrum* Linn." By the International Rules (Code Bruss. 1910, Art. 44) Lamarck should have named his species *R. rubrum* [=L. emend. Lamarck], and his name *vulgare* must be rejected (Art. 51, 5) as invalid ("still-born"), although a later author (Schneider) was at liberty to use it again. The name then is only valid as *R. vulgare* Schneider, 1905, which ranks as a synonym of *R. domesticum* Janez. 1900.



1. *Ribes rubrum.* 2. *R. spicatum.*

But apart from this technical point the names will not do: Lamarck is correct in citing *R. rubrum* L. for the cultivated plant. All that Janczewski says in support of his use of the name for the other species is: "Le nom de Linné se rapporte à cette espèce, car nulle autre n'habite la Suède du Nord (*habitat in Sueciæ borealibus*)." I have already pointed out in this Journal (1916, 260) that this method of precising names "ex loco" is unsound. This case is confirmatory of all I have said, for Linnæus's citation of the habitat is here evidently merely incidental. He says definitely "Ribes (*rubrum*) . . . . racemis pendulis . . ." which immediately excludes *R. rubrum* Janez. He further cites numerous references to the garden plant—*e.g.* J. Bauhin, Historia, ii. 97, 1651, where, after a long account of the edible currant, we read "Passim in hortis colitur," no wild habitat being given. This latter fact is possibly the reason why Linnaeus cites wild habitats, since earlier authorities were often ignorant of them. Yet if these wild plants do not belong to the same species as the common garden red currant, the latter must be cited as *R. rubrum* Linn. excl. habitat. It seems quite definite that *R. rubrum* L. has pendulous racemes and is *R. vulgare* Schneider.

What then is the correct name for *R. rubrum* Jancz. 1900 non L.? The earliest specific name referable to this species appears to be *R. spicatum* Robson in Trans. Linn. Soc. iii. 240, t. 21 (1797)—given to plants which he collected in Yorkshire and Durham—with erect spikes of sessile flowers. Janczewski refers to this only in his alphabetical list of specific names as "= rubrum ?," marking it with an asterisk (as he does also Syme's names): this denotes "noms de l'*Index Kewensis* que nous n'avons pas pu contrôler."

Authentic specimens collected by Robson near Richmond, Yorkshire, are in the National Herbarium—one small shoot in Herb. Banks, four others in Herb. Sowerby which were sent by Robson to be drawn for E. B., t. 1290. In four of these the flowers are subsessile, with a trace of pedicel below the attenuated base of the calyx: in one of the specimens the flowers have distinct pedicels (2–3 mm. long). In Sowerby's original drawing traces of pedicels are indicated, and the lowest spike is flexuous. On this drawing Smith pencilled a note, "racemes upright, corols sessile." The published plate is in accordance with Smith's note, no trace of pedicel showing; the racemes are very stiff and erect, more so than in Robson's figure, which Sowerby's original drawing much resembled. Two of Robson's specimens have the spikes horizontal, not erect. The figure published in Engl. Bot. may then be taken to be exaggerated. Moreover, specimens collected as *R. spicatum* from the same locality by James Ward have ascending racemes with pedicels as long as in *R. petræum* Sm.; while quite normal specimens of *R. petræum* with horizontal racemes were sent thence by him for distribution by the Botanical Society of Edinburgh in 1837. Mr. Bunyard states that the racemes are horizontal, but Janczewski says "horizontales, arquées ou ascendantes." In this connection Syme's statement in Engl. Bot. (iv. 45) is noteworthy:—"Mr. J. G. Baker writes that Mr. James Backhouse, who used to botanize with Mr. Robson, tells him that he doubts if there was more than a single bush known of *R. spicatum*, so that it is probably an accidental sport rather than a true variety. The plant supposed to be *R. spicatum* from between Piers Bridge and Gainsford, Durham, Mr. Backhouse believes to have been *R. petræum* (Sm.)." It is quite possible that Robson based his identification of the Durham plant on the leaf characters and the direction of the racemes, for no red currant without pendulous racemes had at that time been described. As we have seen, he sent a plant with stalked flowers to Sowerby as *R. spicatum*, and in Durham specimens may have ignored short stalks or have only seen the plant in bud when the pedicels had not developed. Whatever the explanation, it seems impossible to regard *R. spicatum* Robson as other than an unusual extreme variation (or sport?) with subsessile flowers of *R. petræum* Sm., *i. e.* of *R. rubrum* Jancz. 1900. The name *R. spicatum* must therefore be used for that species. The fact that it is a "nomen infaustum" is not in modern nomenclature a valid ground for rejection. The corrected synonyms of the two species is:—

1. RIBES RUBRUM L. Sp. Pl. 200 (1753) excl. habitat; Rchb. Fl. germ. exc. 562 (1832) et auct. plur. pro maxima parte; non Janczewski nec Schneider.

[*R. vulgare* Lam. Encycl. iii. 47 (1789) nomen abortivum; *R. pendulum* Salisb. Prodr. 355 (1796) nomen abortivum.]

R. rubrum subsp. *silvestre* var. *Bromfieldianum* Syme, E. B. iv. 44 (1865) including subsp. *sativum*, p. 42.

R. domesticum Jancz. in Compt. Rend. Acad. Paris, cxxx. 589 (1900).

"*R. rubrum* coll." Hedlund in Bot. Not. (1901) 92.

R. vulgare Schneider, Ill. Handb. Laubholzk. i. 403 (1905); Janczewski in Mem. Soc. Phys. Hist. Nat. Genève, xxxv. 276 (1907); Schinz in Vierteljahrschr. Naturf. Ges. Zurich, lviii. 68 (1913).

2. R. SPICATUM Robson emend. mihi; *R. spicatum* Robson in Trans. Linn. Soc. iii. 240, t. 21 (1797); Smith, E. B. t. 1290 (1804); lusus rarus, including *R. petræum* Smith, E. B. t. 205 (1800) non Wulfen.

R. rubrum var. *pubescens* [Swartz Summ. veg. Scand. 2 (1814) nomen nudum] Hartman, Handb. ed. 1, 112 (1820); ed. 3, 62 (1838).

R. rubrum subsp. *silvestre* var. *Smithianum* Syme, op. cit. 44 (1865) including var. *spicatum*.

"*R. pubescens* coll." Hedlund, op. cit. 98 (1901).

R. rubrum Janczewski, op. cit. 589 (1905) including *R. lithuanicum*; Schneider, op. cit. 403 (1905); Janczewski, op. cit. 287 (1907); Linn. l. c. solum quoad habitat.

It should be pointed out that Hedlund seeks to distinguish "*R. pubescens*" from "*R. Smidtianum*" [sic]. But Hartman, who first describes *pubescens* (as a variety of *rubrum*) bases his plant on Smith's *R. petræum* thus: "*β. pubescens*: blad och blomklasar småludna, *R. petræum* Sm. . . . ." Moreover, Hedlund erroneously refers Syme's var. *Bromfieldianum* to his *R. pubescens*, despite its pendulous racemes.

I have followed other workers in including garden plants with pendulous racemes in the same species as the wild ones. Many of our cultivated plants—including the Red Currant as Mr. Bunyard's article so conclusively shows—are now known to be of mixed parentage, arising by hybridisation between two or more species. It does not follow that garden plants with most of the characters of *R. rubrum* var. *silvestre* (*e. g.* pendulous racemes, etc.) are merely garden forms of the wild plant. They may well be segregates from hybridisation in which *R. rubrum* (*vulgare*) was one parent. The garden plants on a natural classification are therefore "*R. rubrum* var. *silvestre* × *R. spicatum* vel (et) × *R. petræum* formæ segregatæ." *R. rubrum* L. was to a great extent this. It would seem, therefore, to be a better plan in this and similar cases to keep the wild species separate from the garden mixture. *R. rubrum* L. should be dropped as a *nomen confusum* or retained as a convenient name for the mixture, equivalent to the popular name "Red Currant." The true wild species, the var. *silvestre*, would be given another name, probably *R. silvestre* Hedlund. Without some such method no natural classification of our truly wild flora can in such cases be given. But in the absence of any special knowledge at present of the original characters of the wild plant this has been left to be done later.

ROBERT BRAITHWAITE.

(1824–1917.)

By H. N. Dixon, M.A., F.L.S.

[Robert Braithwaite was born at Ruswarp, near Whitby, on May 10, 1824. In 1858 after study at University College, London, he took the degrees of M.R.C.S. and L.S.A.; in 1865 he graduated M.D. at St. Andrews. In 1863 he became a Fellow of the Linnean Society, of which body he was a Vice-President in 1889–91, and at whose meetings he was for many years a familiar figure. He took up his residence in Clapham as a general practitioner, retiring from his profession in 1899; in 1869 he married a daughter of Nathaniel Bagshaw Ward (1791–1868) who at that time lived at Clapham.

Braithwaite contributed papers on "New British Mosses" to vols. viii.–xi. of this Journal (1870–73), and published others in the Journals of the Royal Microscopical Society and the Quekett Club, with both of which bodies he was associated: the list of mosses in the Flora of Middlesex is largely compiled from notes contributed by him. Fuller particulars as to his activities will be found, with a portrait, in *The Naturalist* for November last (pp. 361–3), to which we are indebted for much of the above information. Mr. H. N. Dixon has kindly sent us the following appreciation of Braithwaite's scientific work.—Ed. Journ. Bot.]

Dr. Braithwaite was scarcely known to me except as a bryologist. I had corresponded with him for perhaps twenty years before personally meeting him, and even then we met but rarely. My chief personal acquaintance with him indeed was during the last few years of his life, when failing health and eyesight had almost withdrawn him from bryological work, and when an occasional visit from a fellow-worker in the old field seemed to be appreciated, as one by one his former comrades dropped away. Correspondence alone, however, soon revealed, and personal acquaintance only confirmed, his unfailing courtesy and geniality, his readiness to help, his enthusiastic and self-sacrificing pursuit of what he hal made his life-task. My first attempts at Bryology received an encouragement from him without which they might easily have succumbed. When in my Cambridge days the guiding star that so often seems to steer the destiny of the youthful bryologist (so-often by the medium of *Buxbaumia aphylla*) led me to the discovery of *Tortula Vahliana* at Cherryhinton, I well remember the cheer that a warm letter from him brought. Genial and generous as he was, however, he could feel and resent a slight or an injury. Even in what might be supposed the thornless path of bryology, offences *will* come, and one does occasionally in treading that path come across what our American allies expressively term a "snag." But in our thirty-five years of correspondence and intercourse we never had an ill word, though we have not always agreed on points of bryological doctrine. These I think did not greatly interest him; on all such matters he swore by S. O. Lindberg. I do not know how far he had come into personal contact with Lindberg, but that acute bryologist was to him 'guide, philosopher and friend'—his word was almost an *ipse dixit*, and it required very strong grounds indeed to induce him to depart by a step from Lindberg's system.

An artistic affection for the mosses themselves was I believe the real cord that bound him so closely to bryology. He loved the mosses as the Conqueror loved his deer, and he formed his herbarium no less carefully than William made his New Forest, and much less destructively. His indefatigable and painstaking method is evidenced by a work which he gave me some years back, viz. an interleaved copy of Schimper's folio *Versuch einer Entwickelungs-Geschichte der Torfmoose*, the whole of it—some one hundred pages—translated by Braithwaite and written out in a beautiful, almost copper-plate hand.

His artistic sense is shown throughout his work; in the *Sphagnaceæ of Europe and North America*, and still more in his *opus magnum*, the *British Moss Flora*. This elaborate work, a true work of art, the first part of which appeared in 1880, and the last in 1905, bears all the marks of the amateur in the original and highest sense of the word; its elaborateness and high finish indeed in some measure defeated its own purpose, for his intense desire to make it artistically perfect, the high finish of the illustrations, the elaboration of the synonymy, brought the work to such a size and cost, while at the same time extending the period of its publication over so many years as to prejudice very greatly its sale, and Dr. Braithwaite was a loser by several hundred pounds through its publication.

His herbarium, now in the Department of Botany at the British Museum, bears additional testimony, if it were needed, to his painstaking care, and the delicacy of manipulation revealed in his microscopic work and draughtsmanship. He was more concerned to show a good, presentable, typical "specimen" of a species than to follow it in its varieties and forms. Varieties I think, in fact, interested him little, perhaps rather repelled him. Many of us can sympathize with this feeling, and could do very well without them, were it not unfortunately that it happens to be the system on which Nature works.

Apart from his two principal works he published little; which is scarcely to be wondered at, since the British Moss Flora was in itself a life work. He had, however, numerous correspondents, many of them beginners wanting their specimens named. Everyone who has given himself to the study of a group will know—and the less popular the group the better he will know it,—how much demand on one's time this form of hack-work, albeit very helpful and useful hack-work, may make. Yet I never knew him to grumble at it, and it must have occupied a great deal of his time, till in his later years when eyesight began to fail him, and he was often glad to call in my aid to do some "devilling" for him.

Dr. Braithwaite was not a great field botanist. *Trematodon ambiguus* in its lonely outpost on Schiehallion stands to his credit, but I do not think he added much else to our British Moss Flora. Nor did he ever speak of field-work as if he took much delight in it. A north-countryman, I suppose the North drew him, for the only expeditions beyond our borders that I have heard him speak of (except one to Ireland) were to Scotland and Norway, and some of these seemed to have been somewhat ill-starred voyages. He was on the ill-fated 'Chimborazo' when, on a trip to the North Cape, she ran aground off Torghatten I., and all the passengers had to be landed in boats at 1 A.M. He speaks. however, in a letter of a wonderful patch of fruiting *Pohlia albicans* of 20 square feet, between Tromsö and Hammerfest. He told me too of an expedition with Dr. Stirton and Ewing to the Hebrides, when Stirton was to show him the locality, on Benbecula, for some rare or unique *Campylopus* found there thirteen years earlier. Arrived at the spot there was naught but a potato patch to be seen, and the *Campylopus* appeared to have joined the ranks of extinct species. On the return journey they had unpleasant experiences, being nearly overtaken by the tide and nearly or quite benighted by fog. Braithwaite must have looked back on the Outer Hebrides with somewhat similar feelings to those of Dr. Johnson. It could have been no great comfort to him when Dr. Stirton wrote later that he found he had taken them to the wrong spot for the *Campylopus*!

One experience in the field he used to narrate with pleasure, his introduction to James Whitehead. They had appointed to meet in one of the Derbyshire Dales, in search of, I think, *Tortula brevirostris*. The Doctor was first on the spot, and was whiling away the time searching in roadside crannies when he heard a rough voice behind him, "'re you Braithut?" This form of introduction amused him greatly, and he would recount the episode with great gusto.

If, however, he did not do much field-work himself, he led many others to be field-workers by his kind and generous sympathy, and by that delightful blending of geniality with enthusiasm which so often creates the freemasonry of scientific pursuits.

SHORT NOTE.

LEPIDIUM CAMPESTRE VAR. LONGISTYLUM (J. Bot. 1917, 324, 349). Je viens de lire avec beaucoup d'intérêt la note précieuse de Mr. A. Bruce Jackson sur les vicissitudes de l'histoire du *Lepidium campestre* var. *longistylum* A. G. More. Tout est parfaitement exact. C'est seulement la conclusion finale concernant l'existence, en apparence, de formes intermédiaires embarrassantes entre les *L. campestre* et *heterophyllum* qui est contestable. En effet je n'ai jamais rencontré, au courant de mes longues recherches monographiques sur le genre *Lepidium*, de vraies formes intermédiaires entre ces deux espèces. D'autre part, il faut convenir que les caractères indiqués dans les Flores sont insuffisants pour séparer les deux espèces. Dans mon étude monographique sur le genre *Lepidium* (1906), p. 76, les espèces sont caractérisées, dans la clef analytique, comme suit: *L. campestre*: Planta annua vel biennis. Silicula dense papilloso-squamuloso-aspera. Styli pars libera cum maximum ½ mm. longa. Caulis plerumque solitarius e centro rosulæ basilaris, strictus . . . . *L. heterophyllum*: Planta perennis, basi rudimentis foliorum fibrosis vestitis. Silicula non vel leviter tantum squamuloso-papillosa. Styli pars libera plerumque cum minimum 1 mm. longa. Caules complures ex axillis foliorum basilarium enati. *L. heterophyllum* se distingue en outre du *L. campestre* par les fleurs un peu plus grandes, à pétales à limbe suborbiculaire-obové (obové-cunéiforme chez *L. campestre*). Je suis volontiers prêt à déterminer des échantillons qui pourraient faire des difficultés à vos abonnés.—A. THELLUNG, Zurich.

REVIEWS.

Rhododendrons, in which is set forth an account of all species of the genus Rhododendron (including Azaleas) and the various Hybrids. By J. G. MILLAIS, F.Z.S., M.B.O.U. With Coloured Plates by ARCHIBALD THORBURN, BEATRICE PARSONS, E. F. BRENNAND, and W. WALKER; also 14 Collotype Plates and numerous Half-tone Illustrations. 4to. 16 × 12 ins. Cloth, pp. xii, 268. £8 8*s.* net. Longmans, Green & Co.

IN this very handsome volume technically a quarto but corresponding rather with the popular idea of a folio—Mr. J. G. Millais has produced a worthy companion to his great work on *The Mammals of Great Britain.* An enthusiastic grower of Rhododendrons in a county which is famous for these beautiful plants, Mr. Millais has devoted eleven years to their study from a practical point of view in his garden at Compton's Brow, near Horsham, under the tutelage of his friend and neighbour, Sir Edward Loder, of whose wonderful woodland garden he gives a detailed account.

Considering the popularity which Rhododendrons have attained and the number of species which have of recent years been introduced into cultivation, it is certainly remarkable that no illustrated work has been devoted to them since the publication of Sir Joseph Hooker's beautiful volume on *The Rhododendrons of the Sikkim Himalaya* in 1849. Botanists will perhaps regret that Mr. Millais's artists have not been instructed to employ their talents on work of more strictly scientific value than this volume affords; but its primary object is horticultural rather than botanical; its aim, the author tells us, is "to supply a book that may be of practical use to the gardener who only possesses a love of beautiful plants and does not trouble himself with too much science, and also to consolidate in one volume all that is known of the genus *Rhododendron.*" The plates, whether coloured or plain, are of a high order of merit. The "colour groups" by Miss Beatrice Parsons and the drawings of individual plants, mostly of new hardy hybrids by Miss Winifrid Walker are excellent specimens of colour-printing: the smaller pictures of recently introduced Chinese species by Miss Eunice Brennand, some of them not previously figured, will interest botanists, as will the numerous half-tone plates from photographs taken in China by Mr. Forrest showing the species as they actually grow. As to the letter-press, Mr. Millais tells us that "no one can realize what an amount of uncollected facts both as to history, culture and experience there is lying hidden away in the brains of men that have made this genus their hobby"; and this he has brought together with the results of the work of modern hybridists and descriptions—chiefly of Chinese species—scattered through various books and journals and not accessible in a collected form. A special chapter is devoted to the history of the Chinese species, in the course of which Mr. Forrest gives a long hitherto unpublished "summary of all his wanderings as well as the character of the country traversed and the various Rhododendrons to be found there." Another important chapter gives a very full account of the history of the hybridizing of Rhododendrons, beginning with the first recorded—the date is not given—which "resulted in Mr. Thompson's nursery in London through the accidental crossing of *R. ponticum* and *R. nudiflorum*: it is still well known to-day under the name of *R. odoratum* or *R. azaleoides*." "The first successful [intentional] cross may be said to have been *R. arboreum* + *R. ponticum* = *R. altaclarense*, which Lord Carnarvon made at Highclere [near Newbury] about the year 1828." Mr. Millais refers to Bot. Mag. lxii. 1835, t. 3423 for an account of this, but an earlier and fuller notice,—which includes a letter from James Robert Gowen, who directed the crossing—will be found in Bot. Reg. xvii. t. 1414 (1831): the crossing was performed in 1826 and the plants thence obtained flowered in 1831.

The history of the introduction of the genus to cultivation in this country is thus briefly summarized: "The first to be introduced was *R. maximum* which was first flowered in 1756 by James Gordon of Mile End. *R. ponticum* was introduced in 1763 and *R. Caucasium* [sic] in 1803. *R. catawbiense* came in 1809 (Paxton), when John Fraser sent plants to his nursery in Sloane Square and it was common in gardens in 1838. *R. arboreum* appeared about 1820": this had been figured by Smith in 1805 (*Exotic Flora*, p. 6) from a drawing sent by its discoverer, Captain (afterwards Major-General) Thomas Hardwicke, who sent large quantities of seed to England.

It is to be regretted that Mr. Millais was not able to carry out his intention of giving, with the help of Mr. J. Hutchinson, a complete key to the genus: with a view to this Mr. Hutchinson had hoped to examine the herbaria of other countries, "but present conditions have naturally rendered this quite impossible." His sectional distribution of the species is based on that of Bentham and Hooker (1876), which is obviously quite out of date: he also gives, for the benefit of growers, an elaborate artificial key extending over fifteen pages, to the cultivated species. This is followed by Mr. Millais's list, with full descriptions of species and hybrids, alphabetically arranged. One is sorry that in so fine a work anything should be neglected that may add to its perfection; but the typographical arrangement leaves something to be desired, and the misprints—not in this portion only—are far too numerous.

Mr. Millais's modest avowal that his "knowledge of botany as a science is small" sufficiently explains the limitations of the volume from a botanical point of view: botanists, however, will have to consult it, not only on account of the interest attaching to the forms here described and published, but because certain names, if we are not greatly mistaken, are here printed for the first time under the genus and will have to be cited from this work. Of this we had noted numerous examples: it will however be sufficient to cite three—*Rhododendron glandulosum* (*Therorhodion glandulosum* Standley), *R. prunifolium* and *R. austrinum*, both placed under *Azalea* by their first describer, Mr. S. K. Small. It will also be necessary to see whether certain species are not here first described—e. g. *R. sinolepidotum* Balf. et Forrest, for which no reference is given. It would indeed have been well had the proofs been submitted to a botanist, as in certain details—*e. g.* in the references—there is room for improvement.

Possibly we may have overlooked it, but we have not observed any reference to the Rhododendron walk at Kew—far too little known to Londoners—which affords to those who cannot, as Mr. Millais has done, visit the great collections in various parts of the country, notably in Cornwall, a fairly adequate notion of the beauty and variety of the genus—qualities which are fully demonstrated in Mr. Millais's handsome volume.

Musei Barcinonensis Scientiarum Naturalium Opera: series botanica. II. *Introducción al estudio de la flórula de micromicetos de Cataluña, por* ROMUALDO GONSÁLEZ FRAGOSO. Museo Martorell, Barcelona, pp. 187, 1917; 7·50 pes.

THIS Introduction to the study of the microscopic fungus-flora of Catalonia is the first attempt at such a task. The only species hitherto known from that district were those mentioned in Colmeiro's *Enumeracion* of 1889, which included the whole Iberian peninsula. These were 34 in number, with the addition of the dubious *Byssus argentea*, and 27 of these were leaf-fungi belonging to the Uredinales. Besides this there have been only a few papers published in periodicals, containing scattered records.

The present volume enumerates 307 Catalonian species, of which a few are here described for the first time. At the end of some of the genera there are added the names of certain species which may be expected to occur in Catalonia, though not yet noticed there. The genera are arranged on the plan followed in the Italian Cryptogamic Flora by Profs. Saccardo and Traverso. There is one coloured plate of common species and 22 small figures in the text.

The most striking fact that forces itself upon the reader of this volume is the enormous amount of work that remains to be done. Very many of the commonest species are not mentioned, although their geographical distribution makes it evident that they must occur in Catalonia. Among such are, strange to say, *Uromyces Poæ* and the teleutospores of *Puccinia graminis*.

As might be expected under the circumstances, nearly half the work is devoted to the Uredinales and Ustilaginales (words which the author, by-the-bye, spells in an incorrect and indefensible manner). Among the former there are two notes of interest—one records the finding near Barcelona of the Tripolitan species, *Puccinia mediterranea* Trotter, on *Polypogon monspeliensis*, this being the first time it has been seen in Europe; the other record, also from near Barcelona, is of *Puccinia Cardui-pycnocephali*, which has hitherto been found only in France, Italy, and the south of Britain.

Certain genera, such as *Peronospora*, *Phomopsis*, *Septoria*, and *Ramularia*, seem to have been well looked for, but the inadequacy of the present knowledge of others is shown by the fact that only one species is recorded for *Diaporthe*, one for *Peziza* (with only four other Discomycetes), one for *Cytospora*, one for *Hendersonia*, one for *Glæosporium*, and none for *Nectria*, *Hypoxylon*, *Diatrype*, *Dothidea*, *Mucor*, etc., etc.

The publication is of value, nevertheless, because of the careful treatment of the matter, although in the present scarcity of paper it seems wasteful to devote so much to what might easily have been contained in a smaller volume. The author's frequent eccentricities of Latin spelling, also, somewhat mar the satisfaction that could otherwise be derived from a perusal of the work.

W. B. G.

BOOK-NOTES, NEWS, ETC.

At the meeting of the Linnean Society on November 15th, 1917, Dr. D. H. Scott, F.R.S., F.L.S., gave an exposition of his paper, "Notes on *Calamopitys* Unger," illustrating his remarks by a series of lantern-slides and a large specimen of *C. americana* Jeff. & Scott from Kentucky. He stated that *Calamopitys* is a genus of fossil plants, with structure preserved, of Lower Carboniferous age; some species may perhaps go back to the Upper Devonian. The pith, which in certain species contains medullary tracheides, is surrounded by a ring of mesarch xylem-strands. The leaf-trace divides into two as it passes out, and repeated divisions give the petiole, where it is known, the polydesmic structure of *Kalymma*. The tracheides of the metaxylem and secondary wood have multiseriate bordered pits. Two species, included by the author in *Calamopitys*, have been separated by Zalessky under the generic name *Eristophyton*. The first part of the paper deals with the origin and division of the leaf-trace in *C. americana*. The relations of the five known species among themselves, and of the genus as a whole, are then considered. In *C. annularis* (from Thuringia) the zone of primary xylem is almost, if not quite, continuous. The primary xylem-strands are eccentrically mesarch, the protoxylem lying towards the outer side. There is evidence for the presence of scattered tracheides in the pith, rendering the structure essentially protostelic. Each leaf-trace strand, on its exit from the wood, has its own zone of secondary xylem. In all these respects *C. annularis* agrees with *C. americana*, the Kentucky species. In *C. Saturni* (from Thuringia), on the other hand, the primary xylem-strands are completely isolated and centrally mesarch; medullary tracheides appear to be absent. In this species the leaf-trace only divides when outside the zone of secondary wood, while in *C. americana* the division is completed earlier. All these three species had petioles of *Kalymma* structure, containing a number of mesarch bundles. In all of them the medullary rays are usually multiseriate, but in one specimen, referred to *C. annularis*, they are narrow. In *C. fascicularis* (*Eristophyton fasciculare* Zalessky), a British species, the leaf-trace strands, where they leave the small pith, are centrally mesarch, of large size, and perfectly similar to those of *C. Saturni*. Lower down in their course they diminish in size and the centripetal portion becomes much reduced. The protoxylem divides into two as the trace passes through the secondary wood. In *C. Beinertiana* (*Eristophyton Beinertianum* Zalessky) (British and Silesian) the pith is large and contains sclerotic nests, absent in all the other species. The xylem-strands resemble those of the preceding species, but become actually endarch in the lower part of their course. In both the "Eristophyton" species the medullary rays are narrow and the wood has a Cordaitean character. The petioles are unknown. While the generic separation of *Eristophyton* from *Calamopitys* may ultimately be justified, all the five species form a natural series, in which *C. Saturni* occupies in certain respects an intermediate position between *C. annularis* and *C. americana*, on the one hand, and the "Eristophyton" species, on the other. The whole series of species here included in the genus *Calamopitys* appears to belong to the Cycadofilices, the nearest affinity being with the Lyginopterideæ, through *Heterangium*. The great development of the primary wood is a primitive character, indicating that even the "Eristophyton" species had probably not advanced very far in a Gymnospermous direction, though in other characters they show some approach towards the Cordaiteæ.

At the meeting of the same Society on Nov. 29, Dr. Harold Wager read a paper on "Intensity and Direction of Light as Factors in Phototropism" and another on "Sphere-Coloration in the *Agaricaceæ*"—a matter which was treated by the late W. G. Smith in his "Clavis Agaricinorum" published with illustrations showing the colour-distribution of spores, in this Journal for 1870. Dr. Wager stated that the use of spore-coloration as a basis for the classification of the *Agaricaceæ* is artificial and imperfect. There is no clear line of demarcation between the various colours, and the designation of the colours in the text-books is very indefinite and unsatisfactory. A beginning, has, however, been made by members of the Mycological Committee of the Yorkshire Naturalists' Union to obtain more accurate records of spore-coloration in terms of a standard series of tints, such as that of the *Code des Couleurs* by Klincksieck & Valette (Paris, 1908). He has already found—and this may be a fact of some considerable physiological interest—that, with one or two doubtful exceptions, all the spore colours so far standardized, whether pink rusty, or purple, fall within the region of the less refrangible half of the spectrum. Spectroscopic examination also shows this. It has been suggested by Buller that these colouring-matters may serve a useful purpose by screening off certain of the sun's rays from the living protoplasm. If this is so, we ought to find some support for the hypothesis in the more abundant distribution of the coloured-spored species in the open and the white-spored forms in the shade. On tabulating the records of habitats, it has been found that we get approximately:—

Black-spored forms: 24% occurring in the shade, 76% in the open.
Purple ,, ,, 30% ,, ,, ,, 70% ,, ,,
White ,, ,, 90% ,, ,, ,, 10% ,, ,,

The pink-spored forms gave 34% in the shade, 66% in the open. This is intermediate, as might have been expected, between the dark-spored and the white-spored species. The brown or rusty-spored forms, however, gave figures not quite so good, viz.:—52% in the shade and 48% in the open. These figures are only approximate, as they are compiled from a list of habitats which is probably not very accurately determined as regards light and shade. Spore-coloration may, however, depend, partly at least, upon the kind of substratum on which the Fungi grow. It is significant, for example, that a large proportion of the black-spored forms grow upon dung, whilst the white-spored forms are found largely upon the ground, frequently in rich soil in humus, and the rusty-spored forms largely upon rotten wood, old stumps, &c. It would be instructive if careful records were made of spore-coloration in relation to the substratum as well as to light and shade.

UNDER a somewhat ambiguous title *Plant Materials of Decorative Gardening: The Woody Plants*, Prof. Trelease has published (at Urbana, Illinois) in handy pocket form a series of dichotomous keys which, if carefully used, should enable an intelligent observer to identify with a fair amount of confidence any hardy tree, shrub, or woody climber likely to be met with under cultivation in the Eastern United States as well as in Northern Europe. The book is well planned, the materials being primarily divided into four easily distinguished groups: (A) Trees, (B) Shrubs, (C) Undershrubs, (D) Scrambling or Climbing Woody Plants. A systematic arrangement of the various genera follows, with keys to the species under each genus. We think that the usefulness of the keys would have been increased if the page of each genus had been indicated in the keys to the main groups rather than in the index at the end of the volume. A concise description of each genus precedes the keys, which include 247 genera, 782 species, and 375 varieties, contained in 83 natural families. Such highly critical genera as *Rosa* and *Crataegus* are wisely ignored except as regards well-marked species. The determining characters employed are mostly non-technical and easily recognized with the help of a good pocket-lens, while a good glossary is provided for the non-botanist. The author deserves the thanks of botanists and horticulturists for a very useful piece of work: a book on similar lines is badly needed in our country, but to compile this would be no light task, considering that the trees and shrubs in cultivation now number some thousands. Such a compilation would however rapidly become indispensable to the large number of people now interested in this fascinating subject, and used in conjunction with Mr. Bean's useful volumes would prove invaluable to all students of ligneous plants.—A. B. J.

WE have received the Thirty-third Annual Report of the Watson Botanical Exchange Club (1916–17) from which we hope later to make some extracts. It contains the usual interesting notes upon critical genera by Messrs. Marshall, Salmon, Bennett, White, and others, including the distributor for the year, Mr. H. S. Thompson: we are glad to note the almost entire absence of rubbish-heap plants and do not regret that Mr. Wilmott has not been able "to find time at the Museum to write notes on some of the aliens submitted to him." The Report contains a biography, with portrait, of Richard Spiers Standen (1835–1917) who since he joined the Club in 1893 has only once omitted to send an annual parcel of plants: his herbarium was presented to the Department of Botany in 1916.

The recent issue (vol. viii. parts 6–9: Oct. 1917) of the *Essex Naturalist* contains an interesting biography of John Gibbs (1822–? 1892) of Chelmsford, with portrait and bibliography, by Mr. Miller Christy; Mr. Hugh Main figures and describes *Entomophthora americana*, an American fungus "apparently not previously recorded for Europe and certainly not from Great Britain"; an account of the fungus foray and cryptogamic meeting for 1915 contains lists of the fungi and mycetozoa met with and the description of a new species—*Lasiobolus oligotrichus* A. L. Sm. & Ramsbottom; and a report by Mr. Robert Paulson on the Varenne collection of lichens in the possession of the Club.

It is well for the progress of the science of biogeography that any speculations based upon the distribution of either plants or animals have to run the gauntlet of criticism from students of both divisions of the organic world. Almost simultaneously with the publication of Dr. Stapf's admirable "Cartographic Study of the Southern Element in the British Flora" (*Proc. Linn. Soc.* 1916–17, pp. 81–92), Messrs. A. S. Kennard and B. B. Woodward have issued (*Proc. Geologists' Assoc.* xxviii. pp. 109–190) a memoir on "The Post-Pliocene Non-marine Mollusca of Ireland," which should not be overlooked by botanists. Incidentally these authors give an interesting discussion of the origin of *Chara*-marls; but our reason for calling attention to their paper here is that it states strongly supported arguments as to the constitution, date and route of origin of the main elements—Western, Germanic and Nearctic—of the Irish non-marine mollusks, and by implication of the flora. Whilst Dr. Stapf follows Engler and Clement Reid as to the entire destruction of the Irish flora and fauna by the Glacial period and the Post-Glacial re-population of the island, these authors follow Dr. Scharff to the opposed conclusions that the fauna and flora are Pre-Glacial and that there has been no land connection between Great Britain and Ireland since Glacial times. Their discussion of Post-Glacial or Holocene climatic fluctuations, confirming the conclusions of Prof. F. J. Lewis (*Trans. Roy. Soc. Ed.* vols. xli.–xlvii. 1905–11), on lines sketched long ago by Axel Blytt, is also of great practical importance to botanists.

We greatly regret to record the death of Felix Gilbert Wiltshear, who was killed in France towards the end of November. He had been for many years in charge of the Botanical Library at the Natural History Museum, where his intelligence and helpfulness were greatly appreciated by visitors. We hope to say more about him in any early issue.

THE CULTIVATED DAHLIA.

By James Britten, F.L.S.

In the *Journal of the Royal Horticultural Society* (xlii. parts 2 & 3) published in September, Mr. C. Harman Payne (pp. 305–16) gives a full and interesting account of the garden *Dahlia*, with special reference to "its reputed introduction in 1789." He had previously published in the *Gardeners' Chronicle* for Sept. 23, 1916, the more important part of the conclusions at which he had arrived, and Dr. Rendle in the following number added some additional particulars. I had more than once had occasion to examine the specimens in the National Herbarium to which both writers make reference, and it may be worth while to print here the conclusions at which I arrived, though these in the main agree with theirs, with a few additional particulars on one or two points of interest.

Mr. Payne has with much care and thoroughness examined and destroyed the tradition—apparently traceable to Aiton's *Hortus Kewensis*, ed. 2, v. 87 (1813) and repeated by all subsequent writers who have dealt with the subject—that the *Dahlia* was "introd. 1789 by the Marchioness of Bute." The suggestion of Sir David Prain that this statement originated in a misprint for 1798—confirmed, as he shows, by the substitution of the latter date for the former in the *Epitome*, published a year later—is supported by the fact that the *Dahlia* appeared in a "'List of plants in the Hort. Madrid. wanted for Kew Gardens' and marked in Lady Bute's book [at Kew] 1798." "There is nothing to show," says Sir David, "whether the plants were actually received"; but there are three sheets in the National Herbarium, endorsed "C. G. Ortega (Lady Bute)," which Mr. Payne says "were without doubt grown at Kew and thus found their way into Sir Joseph Banks's herbarium, of which they formed a part." In default of more definite evidence, Mr. Payne's expression of certainty appears to me too strong: the writing on the back of the sheets is not known to me—it is probably that of one of the clerks employed by Banks, written when the plant was placed in the Herbarium: other sheets, similarly endorsed, are scattered through the collection, but in no case is there anything to indicate that they came from Kew Gardens—the plants having this provenance are usually endorsed "Hort. Kew." Mr. Payne's reference to "the old inscription on the sheet" rather conveys the idea that this forms but one entry: the name and reference to Cavanilles are however in different hands from the endorsement—the former perhaps in that of Sims, the latter added by Dryander. In view of Mr. Payne's reference to the relation between the specimens and the figures and descriptions of Cavanilles, it should be noted that, although carefully matched, the former are not typical for Cavanilles's species.

My own interpretation of the specimens would be that Lady Bute had a collection of dried plants from Ortega, the Curator of the

Madrid Garden, whose acquaintance she doubtless made when (as Mr. Payne informs us) she was at Madrid with her husband in 1795–7; the fact that one of the specimens is endorsed as "*sent* under the name of *Dahlia cœruleo-rubens*" seems to show that this was not given to her personally when she was in Madrid. Other plants from Ortega in the National Herbarium were received by Banks in 1777. It may be noted that the Solander MSS., which so often are helpful in investigations of this kind, contain nothing relating to the genus.

The introduction of the Dahlia to our gardens was practically due to Lady Holland, in whose garden at Kensington it was first successfully cultivated. Specimens of the plants earliest raised there were sent from the garden to Banks, and are now in the National Herbarium. Mr. Payne refers to these, but as they were not connected with the inquiry upon which he was engaged, does not further consider them. Some time ago I made notes on these specimens, which may be worth printing in connection with Mr. Payne's researches.

The history of the introduction of the Dahlia to the Holland House garden is given by Buonaiuti in the "communication" appended to the *Complete Dictionary of Gardening* (1807) by "Alexander McDonald." Buonaiuti is there described as "gardener" to Lord Holland, but Sabine (in Trans. Hort. Soc. iii. 218) corrects this to "librarian." I have been able to discover very little about him beyond that his Christian name began with S, and that he was still living in 1820. These facts I gather from Faulkner's *History of Kensington*, published in that year, which says (p. 440): "Mr. Buonaiuti, who resides on [Kensington] Terrace, has in his possession the last engraving tools made use of by the celebrated engraver Bartolozzi, previous to his leaving this country, and a proof of the last plate which he finished, with an inscription in his own handwriting expressive of his friendship and esteem." As Mr. Payne points out, Buonaiuti's communication is reproduced (without author's name) in the *New Flora Britannica* (not "Botanica") and *New Botanic Garden*—the same work under another title—the text of which is practically identical with that of the *Complete Dictionary*. According to G. W. Johnson (Hist. Engl. Gardening, 282) Alexander Macdonald was "an assumed name by Dr. R. W. Dickson, of Hindon [Hendon] in Middlesex, author of several agricultural works": I know nothing more about him: the agricultural works under his name in B.M. Library Catalogue range in date from 1799 to 1815. It may be noted that we have in the Department of Botany a large number of the drawings of Sydenham Edwards from which the plates from these works were prepared.

The specimens from Holland House are six in number, four being referred to *D. variabilis* and two to *D. coccinea*. There can I think be no doubt that the names and notes on the sheets are in Buonaiuti's hand, and that the four represent the "four distinct species or varieties" mentioned in his communication to the *Complete Dictionary* as flowering in 1805. This conclusion is borne out by the fact that the MS. note on one of the sheets begins: "This plant came from seeds in 1805"; that three of the sheets are numbered respectively 1, 2, 3;

that the text refers to "*Dahlia Pinnata*, now commonly called *Purpurea*" and that the three sheets bear these two names, placed as synonymous. The name on the fourth sheet, *Dahlia rosea*, is followed by the words "seemly a variety," and the text differentiates this from "the true *Rosea* of Cavanilles." The two specimens referred to *D coccinea* are mentioned by Buonaiuti under that name and as *D. crocata*.

The history of the Holland House plants may be briefly summarized from Buonaiuti's communication. The seeds were sent from Spain by Lady Holland in May 1804, and were at once sown; one plant followed in September of that year. In 1805 many Dahlias came up, among which were the "four species or varieties" already referred to. The final note in the communication is dated July 10, 1806, at which time "above a hundred plants of Dahlias [were] growing in various parts of the gardens at Holland-House in the highest luxuriance."

SILENE NUTANS AND S. DUBIA.

By C. E. Salmon, F.L.S.

Since my note upon these plants appeared in this Journal (1905, p. 127), I have been able to give a little further study to the habits of both, particularly as regards their characteristics at all seasons of the year as they grow side by side in my garden.

Without going into the question of synonymy, I may say that the following observations refer to what I call "*S. nutans*," the Nottingham plant, agreeing with Eng. Bot. tab. 465 (vii. 1798), as compared with examples of a more slender and delicate habit which I suggested might be *S. dubia* Herb. and which is probably quite as frequent a form in Britain.

In the first place, whilst realizing in 1905 that they were clearly distinct, I had not grasped the fact that they could, at all events whilst growing, be so easily separated at all times of the year. Whilst resting in the winter, *S. nutans* as compared with *S. dubia* shows rosettes that are rather more compact, with leaves broader and blunter in outline, more hairy and with shorter petioles; the entire foliage is of a darker green and invariably (?) tinged with a reddish-brown colour. In *S. dubia*, the leaves are longer petioled than those of *nutans*, narrower, more acute, less hairy, and the foliage of a brighter green, tending towards yellow, never (?) tinted as mentioned above.

During the flowering period, many points were noted (op. cit. p. 128) to distinguish the two plants, but perhaps insufficient stress was laid upon the colour of the petals; this in *dubia* is of a yellowish tint ("flores flavescentes" of Herbich) which, noticeable even when the plant is in bud or when the petals are curled during daytime, contrasts strongly, when the flowers are expanded in the evening, with the practically pure-white petals of *nutans*.

When the two plants are in fruit and the capsules quite ripe, the following differences may be noted:—

nutans.	*dubia.*
Carpophore 3–3½ mm. long.	*Carpophore* circa 4 mm. long.
Capsule (including carpophore) 12–14 mm. long, extreme width 5–6 mm.; diameter of reflexed capsule-teeth 4–5 mm.	*Capsule* (including carpophore) 16–18 mm. long, extreme width 7½–8½ mm.; diameter of reflexed capsule-teeth 5–6 mm.
Ripe seeds greyish-black, circa 1 mm. long by ¾ mm. broad, covered with reticulations and with minute acutely-pointed tubercles.	*Ripe seeds* ashy-grey, circa 1¼ mm. long by circa 1 mm. broad, covered with reticulations and with minute bluntly-pointed tubercles.

Summing up the various points it may be seen that *dubia* differs from *nutans*, 1, by its narrower, more acute, less hairy leaves which are of a brighter green; 2, by its petals, with a decidedly yellowish tint; 3, by the narrow and more cylindrical calyx (unlike that figured in Eng. Bot. t. 465) with longer and more acuminate calyx-teeth; 4, the capsule and seeds are larger, the latter paler in colour and with blunt tubercles.

S. infracta W. & K., mentioned by Brébisson as a variety of *S. nutans* (Fl. Norm. ed. 5, 60, 1879), may perhaps be discovered in these islands. Gürke (Pl. Europ. ii. fasc. 2, 316, 1899) gives its distribution at follows:—Suec. Fenn. Gall. Germ. Helv. Bohem. Morav. Hung. Transsilv. Ross.—Canar. It is evidently much more glabrous than "*dubia*," and M. Corbière, to whom I sent a Sussex example of the latter, told me that it could not come under the *infracta* of his Flora (Nouv. Fl. Norm. 91, 1894).

Two corrections must be made in my former paper:—1. Dr. Williams tells me that the distribution quoted (op. cit. p. 128) from his account in Journ. Linn. Soc. (Bot.) xxxii. 171, 1896, does not apply to var. *dubia*, but to the species *nutans* as a whole; 2. Later examination of further specimens from Kincardine (St. Cyrus, W. Gardiner, 1842 etc.) leads me to believe that they are better left under *nutans*. Whilst thus losing this county for *dubia*, we may add S. Hants (v.c. 11), Clement Reid, sp.! 1911, for this plant, and Dorset (v.c. 9), J. C. Mansel-Pleydell! 1886, for *S. nutans*.

Both *nutans* and *dubia* have set a good number of seeds this summer and I shall be happy to send botanists interested in these plants some of either or both, so far as the stock permits.

ALABASTRA DIVERSA.—PART XXVIII.

By Spencer Le M. Moore, B.Sc., F.L.S.

(Concluded from p. 11.)

Dyschoriste Rogersii, sp. nov. *Ramulis* quadrangularibus ad nodos aliquantulum tumidis minute puberulis mox glabris; *foliis* parvis subsessilibus obovatis vel obovato-oblongis retusis minute puberulis; *floribus* in axillis sæpe ramulorum perbrevium solitariis

perpaucisve; *calyce* minute puberulo tubo cylindrico quam segmenta lineari-subulata acuminata paullulum longiore; *corollæ* extus glanduloso-puberulæ tubo ex calyce bene eminente anguste tubuloso sub limbo dilatato limbo optime bilabiato tubo breviore labii antici lobis quam postici longioribus; *antheris* breviter exsertis loculis inperspicue calcaratis; *stylo* pubescente.

Transvaal; n. 12876.

Folia summum fere 1 cm. long, pleraque vero ±6 mm., 3–4 mm. lat. Pedicelli perbreves, raro 2 mm. attingentes. Bracteolæ circa 2 mm. long. Calyx 9 mm. long; segmenta sola 4 mm. Corollæ tubus 1·5 cm. long., inferne 1 mm. sub limbo 4 mm. lat.; limbus 1 cm. long.; lobi omnes oblongo-obovati obtusissimi, antici 6·5 mm., postici 5 mm. long. Filamentorum pars libera vix 4 mm. long.; antheræ apice mucronulatæ, 2 mm. long. Ovarium glabrum 4 mm., stylus 21 mm. long.

Nearest *D. Hildebrandtii* S. Moore, but without the glandular indumentum of that species and smaller in leaf and flower.

Blepharis caloneura, sp. nov. *Ramis* ramulisque teretibus hispidis; *foliorum* pseudoverticillis solemniter 4-nis foliis per paria manifeste inæqualibus omnibus sessilibus anguste lineari-lanceolatis obtusis vel obtuse acutis margine distanter denticulatis tenuiter coriaceis utrinque hispido-scabridis; *floribus* in spicas subglobosas plurifloras ordinatis; *foliis floralibus* lanceolatis apice spinoso-acuminatis margine paucidentatis dentibus spinosis pilis strigosis scabridis glandulosisque copiose aspersis; *bractea sterili* foliis floralibus subsimili nisi multo majore dorso costa centrali insigniter prominente percursa costisque lateralibus optime perspicuis signata; *bracteolis* lanceolato-oblongis spinoso-acuminatis sursum margine dentatis; *calyce* glanduloso-pubescente bracteolas superante segmentis anticis quam posticum paullulum brevioribus 2-dentatis dentibus breviter spinoso-acuminatis margine sub apice utrinque 2-dentatis segmento postico spinoso-acuminato margine utrinque 1-dentato segmentis lateralibus ceteris paullo brevioribus lineari-lanceolatis acuminatis; *corollæ* cæruleæ limbo 3-lobo extus glanduloso-pubescente intus sparsim scabriusculo lobis lateralibus late ovatis obtusissimis quam intermedius ovato-oblongus obtusus majoribus; *capsula* ovoidea obtusa 2-sperma.

Chome; n. 8006. Victoria Falls; n. 13172. Also at Kew, N.W. Rhodesia; n. 8757. Victoria Falls; n. 13154.

Folia pleraque 4–8 cm. long., 5–8 mm. lat., in sicco griseolo-viridia. Folia floralia ± 1 cm. long. Bractea sterilis usque ad 4·5 × 1 cm., sæpissime vero brevior sc. ±2·5 cm. long. Bracteolæ 15 mm. long. Calycis segmentum posticum 22 mm., antici 19 mm. long.; segmenta lateralia 16 mm. long. Corollæ tubus 9 mm. long.; limbus 15 mm. long., sub apice 9·5 mm. lat.; lobi laterales ægre 4 mm. lat., lobus intermedius 2 mm. Capsula dilute badia.

Affinity with *B. sol* Clarke and *B. Welwitschii* S. Moore.

Blepharis cataractæ, sp. nov. *Ramulis* tenuibus pilis decurvis hispidulis deinde glabris; *foliis* per paria inæqualia pseudoverticillatis linearibus breviter spinuloso-acuminatis integris firme membranaceis pilis paucis hispidis præditis necnon margine rigide ciliolatis; *spicis* abbreviatis subglobosis paucifloris; *foliis floralibus* uti bracteæ sparsim hispidis linearibus spinoso-acuminatis integris prominenter 1-nervibus; *bracteis sterilibus* lineari-lanceolatis acuminatis 3-nervibus nervis lateralibus multo minus perspicuis; *bracteis fertilibus* lanceolatis acuminatis 3-nervibus quam bracteolæ paullo longioribus margine ciliato exempto fere glabris; *bracteola* anguste lineari-lanceolata acuminata 1-nervi uti bracteæ fertiles scariosa glabra; *calycis* quam bracteolæ brevioris scariosi segmentis ext. ovato-oblongis anticis bidentatis 2-nervibus postico anticis paullulum longiore acuminato 3-nervoso segmentis lateralibus lanceolatis acutis exteriora fere adæquantibus; *corolla* parva cœrulea limbo extus puberulo intus pubescente 3-lobo lobis late ovatis obtusissimis intermedio paullo minus lato; *capsula* ovoidea obtusa 2-sperma.

Victoria Falls; n. 13153.

Folia majora usque 3 cm. minora usque 2 cm. long., 2·5–3 mm. lat., exstant revera minora. Folia floralia circa 1 cm. long. Bracteæ steriles 12 mm. long. Bracteola 11 mm. long. Calycis segmenta antica 8·5 mm., posticum 10 mm., lateralia 7 mm. long. Corollæ tubus 4 mm. long., limbus 8 mm.; hic sub apice 6 mm. lat. Capsula badia, 6 mm. long. Semina 4·5 mm. long.

Close to *B. Bainesii* S. Moore which, with broader leaves, has longer and more strongly spinous-tipped floral leaves, differently shaped sterile bracts, calyx diverse in some respects, besides white or perhaps pale yellow flowers. In addition Clarke describes and apparently correctly *B. Bainesii* as having no bracteoles, whereas *B. cataractæ* certainly has one, that is to say while the outer of the organs surrounding the flowers are 3-nerved (bracts), the innermost one answers the requirement of a bracteole, viz., in being 1-nerved, although in normal cases two such are present.

Barleria (§ *Eu-Barleria*) **Rogersii**, sp. nov. *Ramis* ramulisque teretibus pilis brevibus stellatis scabridis; *foliis* subsessilibus oblongo-lanceolatis obtusis basin versus angustatis firme membranaceis pag. sup. pilis stellatis subsparsim inspersis subtus præsertim in nervis stellato-pubescentibus; *floribus* spicas breves ovoideo-oblongas paucifloras ramulos breves terminantes efformantibus; *bracteis* calyce brevioribus lanceolato-oblongis acutis dorso carinato-rotundis uti bracteolæ necnon calyx pilis stellatis simplicibus longioribus appressisque intermixtis tomentosis; *bracteolis* lineari-cymbiformibus acutis longit. calycem circiter semiæquantibus; *calycis* segmentis ext. inter se subæqualibus ovatis intus ima basi piloso-villosis anticis breviter bidentatis postico acuto lateralibus linearibus acuminatis quam exteriora plane minoribus; *corollæ* tubo calyce breviore cylindrico sub limbo piloso alibi glabro lobis tubo longioribus inter se æquilongis antico oblongo-spathulato ceteris obovatis omnibus obtusissimus; *staminibus* 2 breviter exsertis staminodiis 2 brevibus antheris exiguis polleniferis instructis; ovario 4-ovulato.

S. Rhodesia, Wankie; n. 13239.

Folia usque ad 6·5 × 2·5 cm., etsi sæpissime minora, e.g. ±2·5 × 1 cm., supra in sicco griseo-viridia subtus pallida. Spica circa 2·5 × 1·5 cm. Bracteæ 9 mm., bracteolæ 8 mm. long. Calycis segmenta ext. 17·5 mm. long., antica summum 7 mm., posticum 6 mm. lat.; lateralia 7 mm. long. Corollæ tubus 8·5 × 1·75 mm.; lobi ægre 1 cm. long. Filamenta inferne dilatata, 8 mm. long., antheræ 3 mm. long., staminodia 1 mm. long, horum antheræ ·4 mm. Ovarium glabrum, 3 mm. long., stylus glaber, 11 mm. long.

The foliage of both species being virtually identical, this might be taken for *B. taitensis* S. Moore which has quite different flowers.

Selago Polygala, sp. nov. Perennis; *ramis* verisimiliter decumbentibus sursum ramulosis crebro foliosis minute pubescentibus; *foliis* fasciculatis sessilibus lineari-oblongis obtusis basi angustatis membranaceis uti bracteæ calycesque microscopice puberulis; *cymis* brevibus racemosis ad apicem rami paniculam foliatam referentibus; *bracteis* oblongis obtusis calycem excedentibus; *calyce* campanulato medium usque diviso lobis oblongo-ovatis obtusis inter se fere æqualibus; *corollæ* tubo infundibulari-cylindrico lobis oblongo-ovatis obtusis vel obtusissimis anticis quam postici majoribus intermedio quam laterales longiore; *staminibus* exsertis; *staminodio* nullo; *ovario* ovoideo-oblongo glabro; *stylo* exserto.

Cape, Worcester division, between Osplaats and Tunnel sidings; n. 16733.

Folia 1–2 cm. long., 2–3·5 mm. lat. Ramuli cymigeri circa 3 cm. long., deorsum foliosi. Bracteæ ±4·5 mm. long., pedicelli circa 1 mm. Calyx 3 mm. long., lobi 1·5 mm. Corollæ tubus 5 mm. long., deorsum 2 mm. sub limbo 2·5 mm. lat.; lobi postici 1·5 mm., laterales 3 mm., anticus 4 mm. long. Ovarium 1 mm., stylus 8 mm. long.

Affinity with *S. hermannioides* E. Mey., but diverse in indumentum, larger fascicled leaves, laxer cymes and larger flowers.

Plectranthus (*Germania*) **Thorncroftii,** sp. nov. *Caule* ascendente sat valido superne ramoso glabro; *ramulis* sparsim foliosis pubescentibus; *foliis* breviter petiolatis oblongo-obovatis apicem versus perpaucidentatis firme membranaceis sparsim pubescentibus; *verticillastris* solemniter 2-floris inter se distantibus circa 5 mm; *pedicellis* calyce longioribus uti calyx glanduloso-pubescentibus; *calycis* florescentis campanulati tubo limbum adæquante lobo postico late ovato acuto lobis lateralibus triangulari-lanceolatis quam antici lineari-subulati paullulum brevioribus; *corollæ* extus glandulis lucentibus sparsim inspersæ tubo postice gibboso inde cylindrico labio postico 3-lobo lobo intermedio suborbiculari alte emarginato quam laterales ovato-oblongi obtusissimi longiore labio antico cymbiformi longit. posticum leviter superante; *genitalibus* exsertis.

Transvaal, Barberton; *J. Thorncroft* (*Hb. Rogers*, 16987).

Planta verisimiliter vix spithamea. Caulis usque 4 mm. diam., laxe corticatus. Folia 20 × 7 mm. attingentia, sed sæpius minora, in sicco brunnea. Spicastra 5–8 cm. long. Bracteæ diutule persistentes, lineares vel lineari-oblongæ, 2–5 mm. long. Pedicelli 5–6 mm. long. Calyx florescens 3·5 mm. long; labium posticum 2 mm. long.; labii antici lobi laterales 1·5 mm., lobus anticus vix 2 mm. long. Calyx fructescens 6 mm. long.; labium posticum 4 mm. lobi ceteri 2·5 mm. long. Corollæ tubus 4·5 × 2 mm.; labii postici lobus inter-

medius fere 7 mm. diam.; lobi laterales 3 mm. long.; labium anticum 6·5 mm. long.

Affinity apparently with *P. Thunbergii* Benth. The habit and comparatively elongated inflorescences with only two flowers to the verticil afford easy marks of recognition.

Acrocephalus (§ *Odontochili*) **katangensis**, sp. nov. Planta annua, spithamea, crebro ramosa; *ramis* pubescentibus sat distanter foliosis; *foliis* parvis lineari-lanceolatis obtusis in petiolum brevem angustatis utrinque glabris vel fere glabris; *capitulis* parvis globosis ad apicem ramulorum laxe corymbosis sat longe pedunculatis; *bracteis exterioribus* lineari-lanceolatis obtusis extimis 2 integris viridibusque ceteris utrinque lobo ovato inciso fusco-cyaneo præditis; *bracteis interioribus* oblate suborbicularibus sursum fusco-cyaneis bracteis omnibus pubescentibus; *calycis* villosuli labiis tubo longioribus antico bidentato postico tridentato; *corollæ* tubo ex calyce eminente cylindrico labio antico ovato integro labii postici lobo intermedio quadrato sat argute bidentato extus pubescente lobis lateralibus ovato-oblongis obtusis; *genitalibus* exsertis.

Belgian Congo, Elisabethville, 4800 ft.; n. 10904.

Folia plerumque 1–2·5 cm. long., 2–5 mm. lat.; petioli 1–3 mm. long. Capitula 6 × 6 mm.; horum pedunculus ± 2 cm. long. Bracteæ extimæ usque 13 mm. long., ceteræ exteriores circa 10 mm. long., harum lobi colorati 4 × 2·5 mm.; bracteæ interiores circa 3 × 5 mm. Calyx florescens 1–5 mm., fructescens 3 mm. long. Corollæ tubus 2·5 mm. long.; labium anticum vix 2 mm. long.; labium posticum 2 × 2 mm. Nuculæ anguste ellipticæ, glabræ, brunneæ, ·7 mm. long.

But for the only pubescent bracts this might be taken at first for *A. gracilis* Briq. which is a member of another section. The affinity seems to be with *A. iododermis* Briq.

NOTES SUPPLEMENTAL TO THE FLORA OF BRISTOL.

By J. W. White, F.L.S.

(Continued from p. 18.)

Pyrus cordata Déségl. *non* Desv. *nec* Boiss. (*P. Piraster* Bor. var. *Déséglisei* Rouy & Camus). An extremely interesting discovery, possibly unique in this country. On a joint excursion last May Mr. Bucknall was the first to notice a couple of pear trees in flower on the edge of a wood between Rangeworthy and Wickwar, West Glouc. On Sept. 6 we found these fruiting abundantly, with a smaller one that may not have flowered. The largest tree has a girth of over four feet, and is about 40 ft. high with a spread of 30 ft. Its age may date from a period prior to the enclosure of the district in which it stands. The leaves are cordate-orbicular or slightly oblong, obtuse or sometimes shortly apiculate, minutely crenate-serrate; the fruit globular, in size about that of a large cherry (diam. 20–25 mm.) on long erect-patent stalks. Thus the trees agree well with the characters of *Déséglisei* so far as given by Rouy and

Camus. Obviously this is a very different plant from the *P. cordata* Desv. (named *Briggsii* by Syme) of which Mr. Briggs sent me a specimen from Plymouth in 1881. That has tiny pyriform fruit, diam. in my example 9–10 mm., "au plus de la grosseur d'une petite noisette" (Rouy), attenuate at the base, and is well described by Boreau, *Fl. du Centre*, where I find no mention of the form under notice. Rouy and Camus hold, however, that Boreau's description covers several of their varieties. *P. Déséglisei* appears to be on record only from Cher in Central France.

P. intermedia Ehrh. In an old hedge about half a mile W. of Cheddar Gorge, 1913!

[*Tamarix tetrandra* Pall. When working on the Tamarisks last year Mr. Bucknall found, from specimens gathered by Mrs. Sandwith, that trees of this species had been planted together with some of the common Tamarisk on the farm under Brean Down. *T. tetrandra* produces its inflorescence on wood of the previous year, whilst the spikes of *T. anglica* are on the young shoots of the season. *T. tetrandra*, too, flowers about two months earlier than the other, a fact which, if it be borne in mind, may lead to its being readily identified in other localities.]

[*Sedum sexangulare* L. Still on Wyck Rocks, 1917! *Miss Roper*. Walls near the Church at Burrington, S. 1917! *H. W. Pugsley*.]

Saxifraga granulata L. S. A large patch on a G.W.R. embankment near Keynsham; first observed and identified from a train by Mrs. Sandwith, and a remarkable instance of dispersal by railway traffic. Although a rare species in Gloucester and Somerset, it is common in Berkshire and grows there on railway-banks, so we may reasonably infer that it has travelled to us from the east. Miss Agnes Fry writes (June 1915) that she received from Lady Lawrence some flowers of *S. granulata* gathered on Lansdown by Bath. The "two places in the Chew Valley, *Thompson*" (*Marshall* in *Journ. Bot.* 1917, 183), will very probably be those recorded years ago by Mr. David Fry when he lived at Stanton Drew (*Fl. Brist.* 327).

[*Heracleum giganteum* Fisch. Several strong plants on rubbish in the old lias quarry near Twerton so often quoted for aliens by S. T. Dunn and others; 1917!]

[*Coriandrum sativum* L. G. Sparingly on a tip at Eastville, 1916! St. Philip's Marsh, 1916; *The Misses Cobbe*.—S. Among mangolds at Failand, 1917; *D. Williams*. On a tip by the Avon at Brislington, 1915! Remembering Babington's description "flowers white" I was at first puzzled by the rose-coloured petals of the Eastville plant. But Hooker and Grenier & Godron inform us that the flowers may be pink or *rougeâtres*.

Coriander, cultivated in Britain, is said to have white flowers, so I am inclined to think that, in this instance, the plant had been introduced with foreign produce and had not sprung from local kitchen-refuse. In the Bristol district it is a rare stray. It seems odd that a herb afflicted when fresh with such an offensive odour (the name is from *κορις* because the green plant, seed and all, stinks of bugs) should yield from its fruit, when distilled in this country, an essential oil so particularly delicate and agreeable in flavour that it masks the taste of some nauseous drugs more completely than any other aromatic employed for the purpose. As is the case with British Lavender and Peppermint, the English oil of Coriander is of far more value than that produced abroad.]

Viscum album L. The additional hosts and new localities that follow have been reported by Miss Roper save where otherwise indicated. A front place is given to the one of most interest—the occurrence of Mistletoe upon the Oak (*Q. intermedia* Boenn.) in Leigh Woods, S. See *Journ. Bot.* 1916, 88. Only ten such trees are believed to exist in England, and none had been previously observed in Somerset. *Crab Apple*, Littleton on Severn, G.; Chelvey Batch, S. *Ash*, Barrow Gurney, S. *Whitebeam*, Brockley Combe, S. *F. Samson.* *Himalayan Birch* (*Betula Jacquemontii* Spach), Tyntesfield Park' *C. Bucknall.* *Hazel*, Bourton Batch, S. *Hawthorn*, Westbury-on-Trym, by the stream, G. Tortworth Park, G. Thornbury, G. Oldbury-on-Severn, G. Ashton Park, S. Tyntesfield, S. West Town, S. Wrington Hill, S. Yatton, S. Chew Magna, S. *Lime*, Old Down, G. Backwell, S. Bourton Combe, S. Barrow Gurney, S. Tyntesfield, S. West Town, S. Salford, S. Chew Magna, S. Chew Stoke, S. *Maple*, Wrington, S. Kelston, S. *Norway Maple* (*Acer platanoides* L.), Brockley, S. *Sugar Maple* (*A. saccharinum* L.), Tortworth Park, G. *Pear*, Flax Bourton, S. *G. H. Wollaston.* West End, Nailsea. *Ontario Poplar* (*P. tacamahaca* Miller), Littleton-on-Severn. *Robinia*, Long Ashton, S. Tyntesfield, S. Wrington, S. (three trees); Saltford Golf Links, S. *Sycamore*, Bourton Combe, S.

Galium Vaillantii DC. Still in St. Philip's Marsh, G., as a casual, 1916; *G. C. Druce.* Abundant in cultivations on the peat near Shapwick and Ashcott Stations, 1913 and subsequently; *Marshall* in *Fl. Som. Suppl.*

G. erectum Huds., G. Several patches in a pasture by the roadside between Stapleton and Hambrook, conspicuous when in full flower at the beginning of June.—S. Walton-in-Gordano! *Rev. E. Ellman.*

× *G. ochroleucum* Syme. S. Furzy pasture between Gatcombe Court and Providence, 1915! *Miss Roper.* Roadside bank on Tickenham Hill! *C. Bucknall.* Cheddar, 1917; *H. S. Thompson.*

Valerianella carinata Loisel. On a wall at Flax Bourton, 1917! *Miss Roper.*

[*Dipsacus fullonum* L. Old lias quarry, Twerton, 1915! *Herb. Roper.* Still there, 1916; *Druce* in *Rep. Bot. Exch. Club.*]

D. pilosus L. A number of fine plants along two hedgerows near Clapton-in-Gordano, 1915! *Misses Cundall.*

Scabiosa Columbaria L. In a plant of this Scabious found by Miss Roper in a quarry near Yatton the main axis was prolonged through the flower-head into several short floriferous stems of smaller size. I have a similar specimen gathered at Clifton by Mr. Testick. Other examples, in a more exaggerated form, have been noticed by Mrs. Bower near St. Michael's Home, Axbridge. In these the florets of the heads were in great part suppressed, their place being occupied by a number of weak, elongated secondary stems each bearing two or three flowers only with a few diminutive pinnatifid leaves shaped like the usual uppermost leaves of the species. This "median floral prolification" is said to be most frequent in plants having their flowers in close capitula.

Erigeron canadense L. Many plants on ground lately used as a mule camp off Yanley Lane, Long Ashton, 1916! Still on Wapping Wharf, Bristol Harbour, 1916!

×*E. Hulsenii* Kerner. This hybrid, observed by Miss Roper in 1911 on the site of abandoned iron works at Ashton Gate, was still there in Sept. 1916. Mons. G. Beauverd, who makes a special study of Compositæ, had never seen this plant, though he had searched for it repeatedly in the numerous Swiss stations where *E. acre* and *E. canadense* grow together: he was therefore glad to get an example from Bristol.

Filago minima L. Still at Hanham, G., after an absence of some years: about 30 plants in Fry's station, 1917; *Miss Roper*. On the coast north of Clevedon, S., with *Gnaphalium sylvaticum*, 1916; *Rev. E. Ellman*.

Gnaphalium sylvaticum L. Drove in Asham Woods, S., 1917; *Miss Roper*.

Antennaria dioica Gaertn. Rough heathy pasture, Failand, S., 1913! *Mrs. Inglis*. A genuine locality, though there is but a single patch of a yard square. Small and scarce on the peat near Ashcott Station, 1913; *C. Perren* in *Fl. Som. Suppl.*

Chrysanthemum Leucanthemum L. In July 1916 a member of the University of Bristol Botanical Club exhibited some Moon Daisies in which the normal outer ring of ligulate florets was replaced by a row of tubular ones. These grew in a pasture near Alveston, G., and were thinly scattered over a space of about ten acres, a wide interval separating each plant from its fellow with plenty of the ordinary form intervening. The altered ray-florets are perfectly white and in most cases regular in shape, but they vary in size and length, the smaller heads with shorter flowers being the more quaint and pretty. In a few plants partial and irregular dialysis of the ray corollas had taken place, showing transitional changes between the ligulifloral and tubulifloral conditions. Changes of form in flowers from an irregular condition to that of symmetry come under the general head of Peloria. In his work *Variation in Animals and Plants* Darwin alludes to the tendency that peloric plants have to revert to the usual form, as shown by the fact that when some peloric flowers were crossed with pollen from flowers of the ordinary shape, and *vice versâ*, not one of the seedlings in either case bore peloric flowers. A similar remark has been made with reference to malformation in general by other observers. Hence it may be concluded that these particular Moon Daisies are unlikely to increase and spread to any great extent, as their peculiarity would not be perpetuated unless the peloric heads had been self-fertilised; this consideration may possibly explain how it is that the individual plants at Alveston are so widely separated from each other. We may suppose that a considerable proportion of the original colony has been replaced by reversions to normality.

Artemisia Absinthium L. In plenty about quarried rock under the limestone ridge between Tickenham and East Clevedon, 1915! Abundant on waste heaps at Portishead South, 1915!

[? *A. Tournefortiana* Rchb. An Asian introduction. Several plants in a cabbage-patch on Wapping Wharf, Bristol Harbour; and on rubbish at St. Anne's, Brislington, 1916! Occurred at Didcot, 1895 (*Druce*); and at Ledbury, 1907 and subsequently (*Bickham*). Of peculiar habit—erect, slender, unbranched and tall, up to four feet in height. In Koch's *Synopsis* this species is described as being glandular-viscid, but our plants are not so.]

Doronicum Pardalianches L. Although not seen for many years in the Glen Frome locality (*Fl. Brist.* 378), it is still there, 1917!

[*Senecio squalidus* L. Is steadily spreading in the district. Portishead Station-yard, 1914–16! On a wall by Wellington Terrace, Clevedon, 1911–14! *Miss Livett.* Banwell; and Kewstoke Bay; *Rev. E. Ellman.* Two plants by the roadside at Clapton-in-Gordano, 1916! *Misses Cundall.*—Var. *leiocarpus* Druce. With glabrous fruit. Two large clumps on a railway-bank near Hallen, G., 1916! *Miss Roper.* Clevedon, 1914; *Miss Livett.* Portishead Dock, 1916! *Mrs. Reginald Price.* The specimens well agree with Mr. Druce's own gatherings.]

[*Xanthium Strumarium* L. Two or three plants in St. Philip's Marsh, 1916! *Miss Roper.* One on Wapping Wharf, Bristol Harbour. Brislington, S.; *Miss M. Cobbe.*]

[? *Ambrosia trifida* L. Site of a mule camp at Webbington under Crook's Peak, 1916! *Miss Roper*, and in a similar field off Yanley Lane, Long Ashton, 1916–17! The identification is not free from doubt as the plants did not agree well with any species described in DeCandolle's *Prodromus.* The structure of the inflorescence is hardly that of *A. trifida.*]

Centaurea solstitialis L. In a spot where turf had been removed from pasture near Northwoods Asylum, G., 1914! *Ivor W. Evans.* Still in St. Philip's Marsh as a casual, 1916; *G. C. Druce.*

Carduus acaulis × arvensis. On a plant gathered by Miss Roper in a rough field at Failand, S., the Rev. E. S. Marshall remarked that allowing for differences of date and locality, and noting the intermediate foliage and short spines at the tip of many of the phyllaries, it came very close to one gathered near Monmouth in 1903. Both were to be considered this hybrid, though not entirely without doubt, as the seeds of Miss Roper's plant appeared to be well developed, and hybrid thistles are very generally sterile.

[*Carthamus tinctorius* L. Alien. Several plants on house refuse north of Horfield, G., 1915! *Ivor W. Evans.* One on a tip at Eastville, 1916. St. Philip's Marsh; *G. C. Druce.* Waste ground by Cranbrook Road, 1917; *C. E. L. Gardner.* A handsome orange-flowered Composite, probably native in Egypt and Abyssinia, and cultivated in many parts of the world for the colouring-matter yielded by the flowers. On account of its frequent occurrence as an outcast in southern countries it has been included in the European flora by Nyman and by Gandoger. In Britain, however, it must be rare, as it was unknown to Mr. Dunn when compiling his *Alien Flora. C. tinctorius* has a special claim to notice here, for according to old chroniclers the plant was formerly cultivated in Gloucestershire both for the flowers and seed. The common people used the flowers instead of saffron in their cakes and puddings and geese and turkeys fed upon the seed.]

Hypochæris glabra L. var. *Balbisii* Lois. Berrow sand-dunes, 1915; *Miss Roper*.

Taraxacum palustre DC. New to the district. G. Yate Common, 1914! *C. Bucknall*. The Ridings near Chipping Sodbury, 1915! *Id*. Furzy field by Milbury Heath Plantation, 1915! *Miss Roper*.—S. Barrow Hill! *Mrs. Sandwith*. Sparingly on Rowberrow Warren! *Miss Roper*. Mr. Bucknall and I regard this as a good species. It flowers only for a short time, being in full fruit at the beginning of June and disappearing by the end of the month. For *T. udum* Jord. we have another locality in the Long Bottom, Mendip; *Miss Roper*. If it be not distinct this seems to be better placed as a var. of *T. officinale* than under *T. palustre*.

Crepis biennis L. Hillside between North Nibley and Wotton-under-Edge, 1912! *C. Bucknall*. Plentiful between Clevedon and Kingston Seymour, S., 1917; *Miss Livett*. The single plant noted near Nailsea Station by Miss Roper in 1900 was the probable parent of a multitude that now covers the whole embankment at the spot.

[*Hieracium pratense* Tausch. Established on walls at Brislington, S.! *Miss Roper*.]

H. cacuminatum Dahlst. Site of old iron works, Ashton Gate, S., 1915! *Id*.

Jasione montana L. See *Fl. Brist.* 410. The square brackets should be removed; Mrs. Lainson's record was confirmed in 1912 by Mr. D. Williams, who then wrote that he had gathered *Jasione* at Clevedon in 1908 and enclosed a specimen. Miss Livett tells me that the locality described by Williams is now in great part built upon.

Campanula patula L. All doubt as to the existence of this in Glos. has been removed by Mr. H. W. L. Harford who forwarded (Sept. 1914) a specimen from Horton. He found on the hillside in that parish two plants in one spot and four in another nearly a mile distant. In fair quantity on Lyncombe Hill, Sandford, S., 1914; *Dr. J. Wigglesworth*.

Andromeda Polifolia L. I apologise to the author of *Winscombe Sketches* for imputing error to his mention of *Andromeda* on Mendip; and also for my rash statement (*Fl. Brist.* 414) that the plant certainly did not grow in those upland bogs. In 1914 Mrs. Sandwith detected on Blackdown two tiny patches hidden under tussocky grass and sedge, and a fortnight later she showed me a sprig in flower. In the same autumn, after an interval of many years, I saw the plant once more upon the peat between Shapwick and Ashcott. There, too, it was small and difficult to find under the clumps of heather.

V. Myrtillus L. Further consideration has led me to believe that the Bilberry may be native on the Court Hill, Clevedon. It is thought to have disappeared at Durbin's Batch. In August 1865 members of the Bristol Naturalists' Society are stated to have observed it "in considerable quantity in the Priory Wood near Portbury."

Erythræa pulchella Fries. Recorded for Leigh Woods by J. Poole in 1837, and found there again in 1915 by the Rev. E. Ellman.

Asperugo procumbens L. Waste ground under Ashley Hill, G., 1912! *Ivor W. Evans.* The old locality at Twerton, S., is still productive according to Mrs. Dent Young.

[*Echinospermum Lappula* Lehm. Still among the casuals in St. Philip's Marsh, 1916; *G. C. Druce.* Several plants on made ground near Brislington, 1912! Fields off Yanley Lane, Long Ashton, lately used as a mule camp! Fowl-run at Clevedon, 1914; *Miss Livett.*]

Symphytum tuberosum L. Several clumps in a small plantation at Failand, with some obvious introductions, 1912! *D. Williams.* Apparently new to N. Somerset.

S. asperum Lepechin. (*S. asperrimum* Donn: *Fl. Brist.* 434). It is certain that at the date of *Fl. Bathon.* the true plant, with short obtuse sepals and upper leaves all subpetiolate, was growing in St. Catherine's Valley near Bath: a specimen from the herbarium of Thos. Clark, gathered about 1833 by Mr. French, is in Mr. Bucknall's possession. It is equally certain not to be there now.

S. officinale L. Varieties and hybrids. Mr. F. Samson has introduced us to a large colony of these Comfreys—× *densiflorum* chiefly, with some × *discolor*, and the vars. *ochroleucum* and *purpureum* in smaller quantity—situate on the right bank of the Chew below Chew Magna, S., no *S. peregrinum* there. × *lilacinum*, the least common of the hybrids, has been found on the Frome near Frenchay, G. In this station the leaves are rather less decurrent and the plant produces more fruit. These habitats are additional to those given by Mr. Bucknall in his revision of the genus *Symphytum* (*Journ. Linn. Soc.* (*Bot.*) xli. 550).

Myosotis collina Rchb. var. *Mittenii* Baker. Penpole Point, G., 1898! *Miss Roper.* Brean Down! S.

[*Solanum triflorum* Nutt. Alien from North America. Wapping Wharf, Bristol Harbour, 1912–16! St. Philip's Marsh, 1914!]

[*S. rostratum* Dunal. St. Philip's Marsh, 1911! My last note of this was in 1882.]

[*Nicotiana rustica* L. "'A green-flowered *Atropa*,' reported to me in 1911 and again in 1912 from near Langford and Dolebury, was probably this and may have originated from the nurseries at Langford." *Miss Agnes Fry.* In Oct. 1912 Mr. Bernard Elton sent me a specimen from Langford.]

Hyoscyamus niger L. Is not known to have recurred at St. Brody's station "Kewstoke Beach," 1856," until last year when it was seen there by Mrs. Sandwith.

Datura Stramonium L. Has recurred at St. Philip's Marsh, 1916; *G. C. Druce.* On a Corporation tip at Eastville, G., 1916! Allotments, Brislington, S., 1916! Several plants among potatoes at Berrow, 1914! *C. E. L. Gardner.* Temple Cloud Bridge! *R. V. Sherring.*

[*Orobanche ramosa* L. Still on rubbish in St. Philip's Marsh, 1915! *Lady Davy.*]

[*Verbascum Chaixii* Vill. On the edge of the large quarry at Providence, Long Ashton, several plants, 1915–17! *Mr. Reginald Price.*]

[*V. Blattaria* L. Again at St. Philip's Marsh, 1916; *G. C. Druce.* Abundant about a fowl-run near Mangotsfield, G.; *Miss Roper.*]

Rhinanthus major Ehrh. var. *platypterus* Fries. The aggregate species has been recorded twice or thrice, at intervals of years, as one of the rarest occupants of the N. Somerset peat moors, and is not known to us in any other locality. The summer of 1915 must have been unusually favourable as Mrs. Sandwith and the Rev. E. Ellman found this form in several spots, and the Rev. E. S. Marshall came upon it in profusion near Edington Junction and to the south of Shapwick Station (*Journ. Bot.* 1916, p. 101). For the occurrence in the same region of *R. major* × *minor* Ehrh. (× *R. fallax* Marshall, × *Alectorolophus fallax* Sterneck), a hybrid new to Britain, see *Marshall* in *Journ. Bot.* 1917, p. 187.

R. stenophyllus Schur. New to the district. G. Compton Greenfield; and Yate Lower Common; *Miss Roper*: naming confirmed by Mr. Marshall.

Euphrasia campestris Jord. var. *neglecta* Bucknall in *Journ Bot. Suppl.* 1917, 19. Plentiful along the southern exposure of the limestone ridge that extends from Ashton Park to Clevedon. Hitherto confused (by me) with *E. brevipila*; or with *E. nemorosa* the species which almost invariably accompanies it and to which it is so similar in habit and characters of flowers and foliage that it can only be distinguished by the short glandular hairs. A recent gathering from gravelly soil at Tyntesfield has the general appearance of *E. gracilis* though densely glandular. Mr. Bucknall wishes it to be clearly understood that other students of the genus may well take a different view of this plant, but he cannot see his way to connect it with the very distinct typical *E. brevipila* as found in many parts of Great Britain.

Odontites rubra Gilib. A very pretty white-flowered form is persistent and rather plentiful on a grassy roadside about a mile beyond the Downend Cemetery, G. First noticed by Mr. H. J. Wadlow in 1908.

Veronica hybrida L. Appeared on the Somerset bank of the Avon under Leigh Woods in 1912.

Mentha piperita L. Is not lost from Mr. Fry's station at Woollard. Mrs. Sandwith has rediscovered it. East Harptree, 1912; *C. E. Salmon.* Marsh at Walton-in-Gordano, probably *vulgaris*; *C. Bucknall.*

M. Pulegium L. Mr. Druce (*Bot. Exch. Club Report*, 1916, 498, vouches for this from "Wrington, Somerset, on the edge of a wood; *Miss Todd.*" Certainly new to this district and possibly to the county: but Mr. C. F. Denning tells me that when formerly residing near Wrington he saw Pennyroyal cultivated in orchards for medicinal use.

M. arvensis L. var. *agrestis* Sole. At the date of publication this was unknown in the district (*Fl. Brist.* 471), but has since been recognized on the peat of Catcott Burtle, S.

Origanum vulgare L. var. *megastachyum* Link. On Lyncombe Hill, Sandford, S.!

Thymus Chamædrys Fries. Is more frequent than was indicated in the *Flora*. Mr. Bruce Jackson was entirely satisfied with gatherings from Failand, Cadbury Camp, Keynsham and Weston-super-Mare; and found several examples of the var. *glaber* among those forwarded by Miss Roper.

Melissa officinalis L. Roadside on the hill at Winterbourne, G.; *H. S. Thompson.* Waste ground by Cranbrook Road, Bristol; *Id.* Roadside between Congresbury and Churchill, very well established for some yards; *Miss Cobbe.* Between Clapton-in-Gordano and Clapton Wick, on the north side of the road; *Id.* Mr. Thompson informs me that his locality "corner of roads near Leigh Woods" communicated to Mr. Marshall (*Journ. Bot.* 1917, p. 187) is in fact the one noted by the Misses Cundall in 1909 (*Fl. Brist.* 476).

Scutellaria minor Huds. Wet spots among heather and brushwood at Milbury Heath Plantation, G., 1914! *Mrs. Gordon.* On Glastonbury Moor with *Hypericum elodes* and *Carex lasiocarpa*, sparingly in several spots, 1914! I think a first record for the peat moors.

Stachys alpina L. Found in 1913 on a hedge bank near Berry Hill Farm between Damery Bridge and Charfield Station, G., by Mr. J. W. Haines of Gloucester. The finder went again a year later and failed to rediscover the spot: he said there were six or eight roots of the plant. The place would be about two miles from Wotton Hill, the original station.

Ballota ruderalis Sw. Alien. One clump on made ground at St. Philips, Bristol, 1915–16; *Mrs. Sandwith* and *T. H. Green.* Growing on the poorest soil the plant is stunted with small leaves, but the calyx-character is unmistakable. It lacks much of the softness that marks my Swedish specimens, and in this accords with the experience of Messrs. Groves who found "no correlation between the shape of the calyx-teeth and the hairiness of the plant." According to Nyman the regions of which *B. ruderalis* is a native are Sweden, Denmark, and Central and Southern Europe. In others it is not seen unless introduced. But neither Syme, Hooker, nor Babington give any indication that the plant is other than indigenous in Britain. The last-named describes it as abundant in a Herefordshire locality where Baker, Purchas and Ley could find only the soft variations of *B. fœtida* that are known to most of us. This statement of Babington, with his italics, has been responsible for much confusion and disappointment, giving rise to the idea that *ruderalis* was a native species that might probably be found in like situations, and leading the botanist to believe that when he came upon a softly hairy *Ballota* he had got the subject of this note. Even Hewett Watson and Bromfield, it will be remembered, mistook for *ruderalis* plants subsequently proved to be forms of *fœtida*. That *B. ruderalis* occurs with us merely as a casual seems tolerably clear. We get its first mention in Leighton's *Fl. Shropshire* (p. 280); Leighton found a single specimen on some waste ground near Shrewsbury in 1835, and forthwith christened it "Rubbish Horehound." Later records are few, at long intervals, of single plants from waste ground and docksides. As regards its status, whether species or variety, the question may well be left to systematists who make a special study of such matters, together with the puzzling fact that whereas by British authors our common Black Horehound is invariably cited as *B. nigra* L. either as type of an aggregate or as a species distinct from *ruderalis* and has for synonym *B. fœtida* Lamarck, Continental botanists on the contrary make *B. nigra*=*ruderalis* and *B. alba* L.=*fœtida*.

Utricularia major Schmid. (*neglecta* Lehm.). New localities for this local rarity found on the peat by Mrs. Sandwith and myself in 1912 and 1913 lie a short distance N.W. of Ashcott Station; and on Tadham Moor not far from the North Drain where the plant was more plentiful. *U. vulgaris* was not present at either spot. Further flowerless gatherings of the doubtful Bladder-wort from Clapton Moor in the Walton valley (*Fl. Brist.* p. 491) have been examined by Mr. Bennett and the Rev. E. F. Linton, who agree that it probably belongs to *U. major*.

(To be continued.)

NOTES ON THE HABITATS OF ORCHIDS.

By Colonel M. J. Godfery, F.L.S.

It is a curious fact that several essentially marsh orchids are also found growing on dry chalk downs. For instance, on the downs near Winchester, *Orchis latifolia* and *O. prætermissa* occur. These forms are smaller and less robust than the types, and are not so numerous, but they appear to be quite happy in their unusual surroundings. *Epipactis palustris* also grows in dry ground near a chalk pit, not far from Winchester. As far as I know, however, *Orchis incarnata* has not yet been found on chalk downs *.

On the other hand, *Gymnadenia conopsea*, which is ordinarily a plant of chalk downs and grassy hills, is in some places found growing in marshes. The most extraordinarily robust plants of this species which I have ever seen occurred in marshy meadows near Winchester, in company with *O. prætermissa*, *O. incarnata*, and *O. latifolia*. They were nearly two feet high, the leaves were as big, broad, and firm as those of *prætermissa*, and the flowers were quite double the size of those of the ordinary plant. It did not show any signs of hybridity.

A beautiful form of *Gymnadenia conopsea*, with bright purplish pink flowers, grows abundantly in marshy ground in Anglesey, in association with *Epipactis palustris*, and I found some very robust specimens also growing with *E. palustris* on wet clayey ground on ledges in sliding cliffs in the Isle of Wight. This is said to be the variety *densiflora*, and the Anglesey plants certainly came very near the description of this variety, the spike being dense, the spur considerably shorter than in the type, hardly exceeding 1 cm. in length, and the scent slightly different from that of *conopsea*, with an element of clove in it. The leaves, however, were quite narrow.

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* The Rev. E. Ellmann informs me that there are several marsh-loving plants belonging to other orders which are also found on dry limestone, especially chalk, such as *Eupatorium cannabinum*, *Cirsium palustre*, *Sagina nodosa*, *Malachium aquaticum*, *Epilobium angustifolium*, and *Phalaris arundinacea*.

Spiranthes autumnalis grows in England, usually on dry hilly pastures on limestone or chalk, in late August and early September. It is abundant in Switzerland on grassy slopes at the foot of the Hardre, near the lake of Brienz. In the south of France, however, it grows in dry woods on siliceous soil, and, strange to say, it is taller and more robust. It also occurs in Malta, where it flowers in September and October. At first sight it seems strange that it should flower later in a station so far south, but it has to wait for the heat of summer to moderate, and for the autumn rains. Perhaps the most striking example of wide variety of habitat is *Epipactis atropurpurea* Raf. (*E. rubiginosa* Gaud., *E. ovalis* Babington), which is normally found in shady borders of woods or in clearings. Its handsome flowers are often seen along the wood-sides in Switzerland, but it also occurs in great numbers on sand-dunes along the coast of the Continent, and in the Tyrol it is found growing at the height of 6000 feet. In the mountains it is generally found on chalk, often in dry barren localities. In Great Britain it is almost entirely confined to bare limestone rocks, growing in the full blaze of the sun, where the soil is of the scantiest. It appears to be equally at home in the rich soil and sheltered shade of woods, the parched dryness of exposed limestone, and the sandy barrenness of coastal dunes—a curious example of adaptability to such diverse conditions of light, heat, moisture, soil, and elevation. It is strange that a plant so easily satisfied should be so rare in Britain, and should practically confine itself to one out of its three different varieties of habitat. It is still more remarkable that an orchid which is found under such extremely different conditions should show such a very small range of variation, this being restricted to differences of size, and of the colour of the flowers. This seems to show that great caution is required in accepting the theory that great ranges of variation can be explained by mere differences of soil and situation.

AN AVERTED CALAMITY.

During the past month the learned and scientific world has been deeply stirred by the astonishing announcement that the Air Ministry proposed to take over the British Museum, both at Bloomsbury and South Kensington, for purposes connected with the War. The perpetration of this "outrage," as one of the weekly reviews called it—and we do not think the expression too strong,—was proposed, it would seem, in entire ignorance of what such a proceeding would involve from a scientific standpoint, and without any consideration as to whether the buildings were suitable for the purpose for which it was proposed to requisition them.

The proposal at once elicited protests from the leaders of art and science throughout the country, whose indignation found expression in the columns of the *Times*, as well as in the London and provincial press. Many learned and scientific bodies supported the protest by resolution: among the latter may be mentioned the Linnean Society, which, at a largely attended special meeting hurriedly convened, adopted the resolutions which will be found on p. 63. One of the most forcible of the published letters was that of Sir Frank Crisp, who speaking for the Natural History Museum, did not hesitate to say—what was only too clearly the case—that those who were responsible for the proposal had evidently no notion of the value which attached to the collections or of the damage which would be incurred in moving them, and were ignorant of the importance attaching to the types which the Museum contained.

Resentment so strong and so unanimous could have but one result: little more than a week after the proposal had been made, the abandonment of the scheme for appropriation was announced by Lord Sudeley in the House of Lords. We append the *Times* account of the proceedings, in which will be noted the admission that the decision was arrived at without consideration, and that the buildings, had they been appropriated, would have proved unsuitable for the purpose proposed:—

"LORD SUDELEY called attention to the proposed appropriation of the British Museum at Bloomsbury to the purposes of the Air Ministry, and of the Natural History Museum at South Kensington for other public offices. He said he was confident that the decision to appropriate the buildings was arrived at by the Government before they had full information. All the learned societies and authorities throughout the country had protested against the proposal to appropriate so great a national trust as the British Museum. The idea was absurd, especially in view of the fact that other premises were available. The Government, he believed, had not availed themselves fully of the accommodation of the Hotel Cecil; and the Port of London Authority's buildings and the Bethlem Hospital could be utilized for the purposes of the Air Ministry. The Natural History Museum had done an immense amount of work for war services. [Hansard adds: "It has, I believe, been consulted by fourteen different Government Departments."]

"EARL CURZON said that, as regards the British Museum, he was glad to state that for the accommodation of the Air Ministry it was no longer necessary to appropriate that building. As to the Natural History Museum, it had been found, after detailed examination, that any attempt to convert the galleries into public offices would involve the closing of the building to the public, extensive internal rearrangements, and the consumption of an enormous amount of labour and material and very considerable delay. In these circumstances it had been decided that there was no necessity sufficiently urgent to warrant the use of the Museum as had been contemplated."

It may be of interest to add here some indication of the help which the Department of Botany has rendered to the Government during the War, so far as this can be done with due regard to certain necessary restrictions:—An inquiry was made concerning a fungus which was destroying army tents at Malta and was costing the Government thousands of pounds: a careful study of the growth of the fungus on canvas treated in various ways led to the discovery of a complete remedy. The destruction of the envelopes of airships was shown to be due to a similar cause, and remedies were suggested. There were inquiries from several sources, including Government departments, as to the use of Sphagnum for surgical dressings; seaweeds and fungi as sources of food; seaweeds as source of potash for manures and other uses; lichens for use as dyes. In addition to these were inquiries from Government departments as to sources of supply of various special timbers, and damage of timber by diseases; composition of fodder alleged to be poisoning horses; moulds attacking sacks of flour in railway transports, etc. Also numerous inquiries as to preservation of fruit against attacks by moulds, diseases appearing on garden allotments and their remedies; the first indication of the potato disease last year was diagnosed in the Department.

BIBLIOGRAPHICAL NOTES.

LXX. Edward Baylis's "Botanic Physic."

An old treatise of Botanic Physic by Edward Baylis, M.D., has lately been shown to me, and as no information about the author or the book can be traced, it may be well to describe it, in the hope that others may supply further details. The title-page is as follows:—

"A new and Compleat Body of Practical Botanic Physic, from the Medicinal Plants of the Vegetable Kingdom selected from some of the best Authors: With useful observations and improvements, necessary regimen and diet, under all diseases. Embellished with beautiful Copper-plates, colored to Nature. By Edward Baylis, M.D., Professor of Botany, at the Physic Gardens, Clifton, near Bristol."

The book is now the property of Dr. Newman Neild, of Clifton, whom I have to thank for letting me see it; it appears to be in the original binding and to have remained since its issue in the library of one person.

Only one volume is known—a handsome quarto of 563 pages with 41 full size copper-plates of medicinal plants, printed in natural colours, and, with one or two exceptions, very satisfactorily executed. No engraver's name appears on the first half dozen of them; all the others bear the impress "John Frederick Miller del. 1791" (or 1792), and it may be assumed that his drawings were used throughout. They seem to have been drawn for the book, as concerning *Centaurea Cyanus* (t. 15) the author states "I have requested Mr. Miller to favour me with a drawing of one of the most curious [special cultivated forms] which I think he has beautifully displayed"; but on all of them there are figured coloured and enlarged details of blossoms and fruit, to which no reference is made in the text. An examination of the plates by Mr. Britten, who published in this Journal

(1913, 255) an account of J. F. Miller's work, confirms the belief that they were executed for this book. At the same time it must be acknowledged that drawings and descriptions do not always correspond, as with the above *Centaurea*; the plant figured is almost certainly *C. montana*, and the text accompanying the figure of *Sanguisorba officinalis* figured relates to *Poterium*.

The publishers' name appears on the title-page, and on the first twelve plates: "published as the Act directs by Stace and Maids No. 11 Hay Market," with the dates for the 1st of the month, beginning March 1791 to August of the same year, omitting June (two plates for each month); this shows the book was issued in parts. From September 1791 onwards the plates bear the name of J. Bew, No. 28 Paternoster Row; the last dated on 1st Nov. 1792. This issue completes the volume, which the author says he cannot close without paying respectful acknowledgements to his numerous subscribers.

The book was issued from Clifton, Bristol; the dedication to George III. is dated 1st January, 1791, with observations "to the candid reader" in praise of the work by "B. L., an eminent Physician, M.D. London, and Fellow of the Royal Society." The Royal Society's list affords no clue to the identity of the Fellow indicated by these initials.

Enquiries at Bristol show Baylis's name in the list of physicians and surgeons in the earliest local Directory extant, for 1792, with the address of Jacob's Well, a district on the outskirts of the best residential parts of the City. He was not attached to the Bristol Infirmary, and I cannot trace his name beyond 1795. There is no knowledge of his garden, which was probably a private one, nor can I obtain any other information about his residence in the city. From remarks he makes in the Treatise it would seem that Baylis had medical experience in London; most of his localities for the wild plants are from near the Metropolis, including Blackfriars. He apparently had no personal knowledge of the plants near Bristol, as he does not even record the presence in quantity of his favourite "Alexanders" on St. Vincent's Rocks, although he refers to the Hotwell Waters and the mild air of Clifton.

Baylis was probably of middle age at the time of publication, as he gives advice to "young practitioners," and tells of his family, and of his secret gout remedy which had been dispensed for twelve years.

His name is not in the lists of Alumni at Oxford or Cambridge, but he refers to "our College of Physicians" and to a "fellow-collegiate" which need not imply that he was a member; and although he uses the title of M.D. does not appear on the Roll of the Royal College of Physicians.

The plants whose medicinal properties are described are arranged in alphabetical order, 19 plants having common English names beginning with the letter A, 27 with B, and 10 with C. The author, whose literary style leaves something to be desired, after describing the first few under each letter states that he had intended to stop there, but "thought it more advisable to render the work compleat by adding the virtues of those plants I was unacquainted with of our own country, from the best authorities extant"; he accordingly gives extracts from such writers with descriptions and habitats for 13 of the letter A, 10 of B, and none of C. This leaves only 27 plants of which he knew the properties by experience. so that his "botanic garden" does not seem to have grown many herbs.

Each plant has a chapter to itself, beginning with the names in Latin and English with synonyms, a careful tabulated description of the floral parts, and then the virtues, set out in numerous pages by long extracts from the writings of many authorities—some ancient, such as Antonius Musa (c. A.D. 1) for Wood Betony, Augenius for Bishop's Weed; and others more modern, Doctors Alleyne, Brookes, Bowles, James, Lewis, and Strother, with many unnamed "learned physicians" and a few of the earlier herbalists. The chapters end with "observations by the author," wherein he describes how to prepare cures for different diseases, learnt from his own practise. Amongst the latter are lengthy remarks on special maladies, with their causes and general treatment. He is particular to write against strong drinks, but approves of tea and recommends fresh air, such as is to be found on "rising ground . . . . with pleasant flowers at Hampstead, Highgate, or Epsom . . . . [and] here in London."

A long effusion concerning gout takes the form, under the plant Burdock (*Arctium Lappa* L.) of an advertisement of a secret remedy of his own, discovered twelve years before and since improved upon, which he cannot further disclose "on account of the duty I owe my family." There is an advertisement of the preparation, which can be obtained at one guinea per quart through his "publisher Mr. Bew, Bookseller," and a favourable testimonial from six grateful sufferers, headed by "John Clarke, Esq., one of H.M. Justices of the Peace."

Among those who have helped him Baylis mentions "a clergyman in the West of England, who has had much experience and done much good in the botanic practice" (p. 436) and "an African Prince who was here from an insurrection in his country," who communicated to [him] remedies used by the natives (p. 367). He also refers to "a gentleman in the west of England who, though engaged in a very large concern," has "set apart one day in the week" to attend those afflicted with disease of the eyes (p. 450).

The book as a whole affords little evidence of botanical knowledge and its nature suggests a suspicion that the author's degree may have been self-conferred; the absence of any possible "-B.L." from the Royal Society's list confirms this view. The work seems to have come to an abrupt termination, as the words "volume I." are erased from the title-page, though they can still be traced there. On the back of the last page is a reference to a plate of *Primula veris* which does not appear in the book, indicating that drawings had been prepared for its continuation.

Although not of scientific importance, it is surprising that so pretentious a work should have almost entirely escaped the notice of bibliographers. It appears in Dr. Daydon Jackson's useful *Guide*, but he has never seen the book, and does not know where he found it mentioned. Possibly this notice may lead to the discovery of further copies, and of more information concerning the author.

IDA M. ROPER.

SHORT NOTES.

Exostemma Sanctæ Luciæ (Journ. Bot. 1915, 138). In looking over early volumes of the American Philosophical Society's Transactions recently, I came across the title: "Medical history of the Cortex ruber, or red bark; communicated to John Morgan, M.D." (Trans. Amer. Phil. Soc. v. 2, pp. 289–293. 1786). This consists of an extract from a letter of Thomas S. Duché, dated London, August 9, 1783, on properties of the bark, together with a letter from George Davidson of St. Lucia, dated August 29, 1783, to which is appended the description (not a technical one) of *Cinchona Caribæa Sanctæ Luciæ.* This was read before the Philosophical Society, Feb. 20, 1784, but evidently was not published until the title-page date 1786, as articles of the latter date are scattered throughout vol. 2 of the Transactions. In trying to authenticate this species for our catalogue, I looked up the paper in Journ. Bot., and was much interested to find that the plant had not been named by Davidson in Phil. Trans. vol. 74. I suppose that the earliest published name is still that of Kentish, no copy of whose work is available in Washington, though there is one at the Arnold Arboretum; but it is worth noting that Davidson himself actually did give a name to the plant; also that the first communication in regard to it was made to the American Philosophical Society, and not the Royal Society of London, where the paper was read June 24, 1784.—Marjorie F. Warner, Bibliographical Assistant, U.S. Dept. of Agriculture, Washington.

Veronica Buxbaumii. Since my note on these names was published (Journ. Bot. 1917, 271) I have obtained conclusive evidence that *V. persica* Poir. is identical with *V. Buxbaumii* Ten., and is therefore the correct name. I have myself examined the specimen of *persica* in Lamarck's herbarium at the Paris Museum—which bears the label "*Veronica persica* hort. Paris, du Jardin des Plantes 13 Juillet 1813"—and found it to agree perfectly with *Buxbaumii.* Poiret's own type specimen now in Herb. Cosson, which is also at the Museum, Poiret's plants having passed to Moquin-Tandon and from him to Cosson, I was accidentally prevented from inspecting; but M. Lecomte has kindly examined it for me with the help of two of his assistants, so as to make assurance doubly sure. I had sent for comparison fruit of *V. agrestis* and specimens of *Buxbaumii*, gathered in autumn as well as in spring in the same field near Petworth. The autumn (October) specimens have fewer and much smaller corollas than those gathered in May. M. Lecomte writes: (1) "The specimen of *V. persica* Poiret (Herbier Cosson) = *V. persica* of Lamarck's herbarium. Poiret has added the synonym = *V. Buxbaumii* Ten. (2) Mr. Lacaita's specimens seem to belong to the same species as those of Lamarck's and Cosson's herbaria. (3) These (Lamarck's and Cosson's) have not got the capsules of *V. agrestis* sent by Mr. Lacaita." If Poiret's own identification of his specimen with Tenore's species had not been overlooked for all these years, doubts would not have been cast on the identity of his *V. persica.*—C. C. Lacaita.

LEPIDIUM CAMPESTRE var. LONGISTYLUM. Mr. Wilmott's second note (Journ. Bot. 1917, 349) greatly interests me. I learn from it the new fact that *L. heterophyllum* may have a solitary stem, and that *L. campestre* var. *longistylum* A. G. More was validly published in 1860. It may be urged that More's name should be used instead of my *L. campestre* f. *pluricaule* (Die Gattung Lepidium, p. 94, in N. Denkschr. all. schweiz. Ges. f. ges. Naturw. Bd. xli. 1907 : vol. xli. of the periodical is dated 1916, but separate copies (my thesis for the doctorate) were distributed in November 1906). I think, however, this is not to be recommended, but that it would be preferable to relegate More's name to synonymy, as its retention would lead to confusion.—A. THELLUNG.

THE NAME MUNDIA. In this Journal for 1889 (p. 262) and 1894 (p. 109) the origin of the name of this genus was discussed. The name, which is usually quoted as of Kunth, was published in H. B. K. Nov. Gen. v. 393, n., "1821" (rectè 1823) without any indication as to its dedication; the fact however that it was based on a South African plant (*Polygala spinosa* L.) led to the inference that it commemorated, as suggested by Harvey (Gen. S. Afr. Pl. 26), "M. Mundt, a most meritorious collector of South African plants"; and on this account Harvey changed the original spelling of the name to *Mundtia*. Subsequently however it was suggested that Henry Mundy (1627?–1682) whose work was known to Linnæus, might have been intended. No information about the S. African collector was traceable; but I have lately come across a reference by W. J. Hooker (Bot. Mag. t. 3894: 1842) in which he speaks of "the Prussian botanist, the late Mr. Mund," as having sent him specimens from the Cape. Whether the name should be spelt "*Mundtia*," as by Harvey, who seems to have been acquainted with the collector, or "*Mundia*," as first published and as supported by Hooker's reference may be matter for discussion; but it is clear that Henry Mundy has no claim to the commemoration.—JAMES BRITTEN.

STATUS OF ALLIUM TRIQUETRUM IN BRITAIN. In the *Proceedings of the Linnean Society*, October 1917, p. 81, Dr. Stapf says that he had put this down as doubtfully indigenous, but considers it now as an alien. Davey, however (*Flora of Cornwall*, p. 438), says:—"Native (apparently). Hedges, borders of woods, sides of streams, &c. Locally frequent": he gives about thirty-four stations for his four western districts. My own former view was that it had most likely been introduced; but I found it last June in two places where there seemed to be no element of suspicion, viz. by a streamlet, about a mile north of Helston, and among bushes on the coast, between Landewednack and Cadgwith. As *A. triquetrum* grows wild in Portugal and Spain, though not in Western France, it may be a true member of our Lusitanian group in at least some of the Cornish localities.—EDWARD S. MARSHALL.

GLYCERIA FOUCAUDII AND G. FESTUCÆFORMIS. Dr. Stapf (*l. c.*) writes:—"A revision of the British *Atropis* has convinced me of the identity of *A. festucæformis* from Co. Down, Ireland, with *A. Fou-*

caudii, which therefore takes its place in the tables of my original paper as an Atlantic species." An examination of my series of both fully confirms this view. On my No. 867, from Grain, E. Kent, gathered in 1892, Prof. Hackel, naming it as "*Glyceria Foucaudii* Hackel in litt. ad Foucaud (n. sp.)"—Foucaud described it under *Atropis*, in Bull. Soc. Bot. Rochelle, 1893, p. 43—added this interesting comment in a letter to Mr. Arthur Bennett:—"You may distinguish it from all the congeners (it comes next to *G. maritima*) by the silky pubescence of the nerves of the flowering glumes, and by the *ciliated* upper palea, &c." This ciliation tends to wear off, with age. I have several sheets from the Kentish station, besides specimens from Mudeford, S. Hants (*E. F. Linton*), Chichester Harbour, W. Sussex (*G. C. Druce*), and Auginish Island, Foynes, Co. Limerick (*Miss M. C. Knowles*).—EDWARD S. MARSHALL.

PEDINOPHYLLUM INTERRUPTUM (Nees) Lindberg. The late Dr. Carrington in his *British Hepaticæ*, p. 53, gave Ardingly Rocks, Sussex, as a station for this species, which I quoted in my *Hepaticæ of the British Isles*, p. 270. Mr. W. E. Nicholson in his "Hepatics of Sussex," 1911, says "There is a note in Hb. Davies questioning this record, which is inherently improbable, as it is unlikely that so markedly calcicolous a plant should be found on the sandstone at Ardingly." In the Manchester Museum there is a specimen marked "*Plagiochila interrupta* Ardingly Rocks; Mitten's *J. trichomanioides*, G. Davies, on loam: *Plagiochila pyrenaica* Spruce! var. of *Plag. interrupta* B. C." I have had the opportunity of examining the specimen and find it is a form of *P. asplenioides*: the firm stem, some of the leaves denticulate (which is never the case with any form of *P. interruptum*), the absence of stipules, confirm Mr. Nicholson's conjecture.—WM. HY. PEARSON.

PANICUM SANGUINALE L. This plant is not included in the *London Catalogue* although it is abundant over most of Jersey, on the borders of roads, in waste places and in semi-cultivated fields. Mr. Lester-Garland who is very cautious as to the status of a plant states in his *Flora of Jersey* that "it is native in all probability," and Messrs. Stanley Guiton and T. W. Attenborough who have worked at the flora of the Island for many years are of the same opinion. As it is frequent in Normandy and Brittany and common further south, there is nothing from a geographical point of view against its being native in Jersey. It is suggested that its absence from the *London Catalogue* is due to its omission in the *Primitiæ Floræ Sarnicæ*, but for the reasons given by Mr. Lester-Garland in his introduction to his *Flora of Jersey* the inclusion or exclusion of a plant in the *Primitiæ* is very slight evidence one way or the other. Here again Messrs. Guiton and Attenborough concur in Mr. Lester-Garland's statements. I have been many times to Jersey during the flowering season of this plant, and it always seemed to me that it had as much right to be considered native as the bulk of the rest of the Flora. The form β. *ciliare* Trin. also occurs in the island, but there as in France less frequently than the type. EDWARD WALTER HUNNYBUN.

Cuscuta europæa L. in Middlesex. I collected specimens of this plant for a drawing for *The Cambridge British Flora* in July of this year growing near the Albert Bridge, Old Windsor. Its hosts were *Urtica dioica* and *Humulus Lupulus.*—Edward Walter Hunnybun.

REVIEWS.

The Anatomy of Woody Plants. By Edward Charles Jeffrey. With 306 Illustrations. University of Chicago Press, Chicago. Pp. x & 478. Price $4. October, 1917.

This work by the well-known Professor of Plant Morphology in Harvard University has been expected with much interest. The expression in the Preface, "woody or so-called vascular plants," suggests that the two terms are synonymous, and, as a matter of fact herbaceous forms are by no means neglected, though special prominence is given to the woody types, in accordance with the author's belief in their primitive nature.

Great stress is laid throughout on the supposed "Canons of Comparative Anatomy" formulated in Chap. xvii. It is even stated in the Preface that "any conclusions not in harmony with them have ordinarily not been considered" (with certain exceptions). This at once indicates the highly deductive character of the treatment, though the word "induction" is often used. The book, in fact, is essentially an able exposition of the views of Prof. Jeffrey and his school; it will therefore be read with the most advantage by those who are in a position to read critically.

The general plan of the book is as follows:—After a short chapter on the cell, we come to the tissue-systems. Next follows a chapter on wood in general, succeeded by four on the secondary wood and one on the phloem. The epidermis and the fundamental tissues occupy Chaps. ix. and x. Then we have a chapter on the definitions of the organs, succeeded by three on the root, stem and leaf, respectively. Then follow two chapters, which it is a welcome surprise to find in an anatomical text-book, on the microsporangium, and on the megasporangium and seed. We then arrive at the important Chap. xvii, which lays down the author's "Canons of Comparative Anatomy." The arrangement of the next 12 chapters is systematic, from the Lycopodiales to the Monocotyledons. Chap. xxx. is on anatomical structure and climatic evolution: Chap. xxxi. treats of the evolutionary principles exhibited by the Compositæ, and the last chapter is devoted to anatomical technique. The arrangement involves a certain amount of repetition, which, however, serves to bring out the points on which the author desires to lay special stress.

In defining the tissue-systems the author returns to Sachs's old divisions, the epidermal, fibrovascular and fundamental systems. The stele, so prominent as an anatomical unit in the work of the last quarter of a century, thus disappears; it is rarely mentioned and is not to be found in the index. This striking reversion in terminology is intimately connected with the author's theory that the pith is of common origin with the cortex and so does not belong to the central cylinder.

Much attention is given to the wood (especially the secondary wood) as this is the tissue for which the best fossil evidence is available; the libriform fibres are derived from tracheides, not from parenchyma as Strasburger held. Evidence is given also for the origin of xylem-parenchyma and of the so-called medullary rays from tracheides, and some excellent new figures of Lepidodendroid structure are furnished, in support of this view. The statement (p. 40 and elsewhere) that tangential pits are absent in Palæozoic woods is erroneous; they have long been described in *Pitys antiqua* and also occur in *Mesoxylon multirame* and doubtless in other species. In Chap. vii. there is an excellent comparative account of xylem-vessels in Gnetales and Angiosperms. The epidermis is said to be of "relatively slight phylogenetic interest." Yet the stoma is probably the most conservative organ of plants.

The common term *medullary* rays is repeatedly condemned, on the ground that their relation to the pith is only a "semblance," due to obsolescence of the primary wood. This may be true, but the relation is of very old date, for it was already well established in the Calamites and some of the Cycadofilices. From the author's point of view the wide ray is a compound one, derived from the aggregate type of ray; the vascular bundles were not originally separate, and the statements of Sanio and Sachs as to the bridging over of the primary gaps by interfascicular cambium are rejected. They are, however, true, as a description of the facts, and hold good for the young Calamite as well as for more modern plants.

On the general question of the relation of herbaceous to arboreal types, it may be pointed out that there is no proof that our existing herbaceous Lycopods came from arboreal ancestors; the herbaceous *Selaginellites* was contemporary with the arboreal Lepidodendreæ. The siphonostele is held to have primitively possessed phloem on the inner as well as the outer surface. This type of structure, however, is rare among Palæozoic plants.

In the chapter on the microsporangium the author adopts the view that the higher plants arose from forms like the thallose Liverworts, and quotes Bower's *Origin of a Land Flora* in support of this theory. No mention is made of Prof. Bower's subsequent change of view.

The "Canons of Comparative Anatomy" on which the author insists are three in number—Recapitulation, Conservative organs and Reversion. The doctrine of recapitulation in the development of the individual of the history of the race is well known though no longer accepted without question. The author points out that *negative* evidence is of little or no value, but doubts may arise as to what testimony *is* negative; in a Pine-seedling for example, short-shoots are absent, but foliage-leaves on the main stem are present.

Among conservative organs the leaf is first cited, and then the reproductive axis. The present writer is given the credit for the latter idea; it belongs rather to Solms-Laubach, but neither generalised the conclusion, which was confined to the peduncles of Cycads. Floral axes are subject to modifications of their own, and are not necessarily conservative. As regards the root, the primary structure is no doubt highly conservative, but it does not follow that the same is true of its secondary tissues.

The word "reversion" is used in a peculiar sense, for certain effects of wounding, believed by the author and some others to be reminiscent of ancestral characters. This doctrine has hitherto been employed only in support of certain controversial opinions, and has not yet been adequately subjected to impartial criticism.

The worst of all such "canons" is that every writer applies them as suits his individual views, and treats inconvenient cases as exceptions.

In the systematic part of the book we first come to the author's well-known division of the higher plants into Lycopsida, without, and Pteropsida, with, leaf-gaps in the vascular ring, a classification widely accepted, though it is now realized by many botanists that Sphenophylls and Equisetales have little in common with the Lycopod group.

The author's doctrine of the cortical origin of the pith is applied even to the Lycopods, where the evidence seems peculiarly unfavourable to this interpretation. It is a pity that the exact developmental processes involved are not more clearly explained. His views on the evolution of the Osmundaceæ are well expounded; the strong case made out would have been more convincing if the facts on the other side, brought forward by Kidston and Gwynne-Vaughan, had been dealt with.

The lower seed-plants are divided into Archigymnospermæ, including Cycadofilicales, Cycadales, Cordaitales and Ginkgoales, and Metagymnospermæ consisting of the Conifers and Gnetales. It is well pointed out that *Ginkgo* forms a link between the two main divisions. The long chapter on Coniferales is chiefly devoted to an exposition of the author's well-known view of the primitive position of the Abietineæ, and especially of *Pinus*, and the derivation of the ancient Araucarineæ from that group. This hypothesis is maintained with great ingenuity, in the face of much inherent improbability. The opposite theory of the direct derivation of the Araucarineæ from their immediate Palæozoic predecessors the Cordaiteæ has been considerably strengthened by the work of Boyd Thomson and Burlingame. The view, maintained by Wieland and his followers, of an affinity between the Bennettitales and the Angiosperms, is rejected. In this connection it may be pointed out that we have no actual proof that fertilization in *Bennettites* was by spermatozoids, as the author assumes.

The chapter on Herbaceous Dicotyledons is important, for it sets forth in detail the author's theory of their derivation from arboreal ancestors, a view which is well worthy of consideration. The author believes that the fresh and vigorous herbaceous vegetation will tend in future to supplant the forest trees; he has no such hopes, however, for the Monocotyledons, which he acutely remarks (p. 198), may be said to represent the second childhood of the vascular plants. "This group seems to have reached such a high degree of specialization that it will probably in the long run entirely disappear and be replaced by new derivatives of the still plastic dicotyledons" (p. 416). Such a consummation, however, is not likely to be reached while Man remains dominant.

In the chapter on anatomical structure and climatic evolution, the question of annual rings is considered. While the author finds no such rings in Cordaitean wood from Prince Edward Island (lat. 45° 30′) he believes that they are present in contemporary wood from Lancashire (lat. about 53° 30′). The difference of latitude seems too small to be significant, and most appearances of annual rings in Carboniferous woods from any source are fallacious.

Chap. xxxi. is on a special subject—the evolutionary principles exhibited by the Compositæ—and is chiefly concerned with the somewhat narrow question of the distribution of oil-canals.

The concluding chapter is on anatomical technique, including the sectioning of coal and photomicrographic methods. On all these subjects the author is an acknowledged expert, and his counsels will be of the greatest value to practical workers.

The index might perhaps have been made fuller with advantage. No references are given in the book; the accumulation of references often becomes a burden, but a few would have been of service to the reader as a guide to his future studies.

In the present notice attention has often been directed to points which seem open to criticism or on which there is much difference of opinion. These divergences of view in no way detract from a high estimate of the great interest and complete originality of Prof. Jeffrey's remarkable work.

The illustrations, as one would expect in a book by this author, are abundant and excellent.

D. H. S.

About Ferns.

The question of what constitutes a true species has engaged the attention of Mr. Frederic K. Butters ("Taxonomic and Geographic Studies in North-American Ferns"—in *Rhodora*, xix. 1917, pp. 169–216). Finding that the commonly accepted distribution of some of the best known ferns is much wider than is usual in the case of phanerogams, and that it is often quite at variance with the laws of distribution as worked out for phanerogams, he decided to make a critical study of some of the ferns which are supposed to have a very wide and anomalous range. Being of opinion that too much reliance has been placed on such superficial characters as details in the form and cutting of the fronds, he has deemed it wise to study such technical characters as the size, form and sculpture of the spores, and details of the structure of the sporangia, sori, indusia and scales, in the hope of finding characters of a more stable nature. This investigation has led to the separation of species and varieties in the case of several common groups of ferns, and in other cases to the recombination of forms supposed to be distinct: and, as a result, it is found that the fern-species thus reformed have geographical ranges quite in harmony with the laws of distribution applicable to phanerogams.

The first of the studies here published treats of the genus *Athyrium*. Among the conclusions reached are the following:—(1) In the Eastern United States and Canada there are two distinct species of Lady Ferns, neither of which is conspecific with *A. Filix-femina* (L.) Roth of Europe; one, *A. asplenioides* (Michx.) Desv., is prevailingly southern in its distribution; the other, *A. angustum* (Willd.) Presl, is prevailingly northern. (2) The plants of the north-west are conspecific with the European plant, though in some cases differing in minor points. (3) The Californian plants and those of the southern Rocky Mountains differ more markedly from the European, but are not clearly distinct from the more northern form, and therefore are best considered as an aberrant geographical variety of *A. Filix-femina*. (4) A boreal and high alpine fernl found in eastern Quebec and in the alpine areas of western North America is a clearly distinct geographical variety of the Old World *A. alpestre*.

The second study is concerned with *Botrychium virginianum*, which when closely scrutinised proves to be readily divisible into natural varieties, four of which are new to science and are limited to North America, and one other which includes Europe in its geographical distribution.

The author promises further instalments of this interesting and much needed investigation.

British Ferns and How to Know Them (Methuen: London, 1917. Price 1*s.* 6*d.* net) is the title of a popular work by S. Leonard Bastin, designed to guide the beginner in his early struggles to distinguish our native ferns. Himself evidently a grower and an amateur, the author has produced a readable account of nearly seventy ferns and fern-allies, described in simple terms from living specimens, either wild or cultivated. Though he seldom makes mention of such small but important characters as venation, trichomes, &c., yet he often provides items of practical and helpful information about habit or habitat, which are usually lacking in the ordinary handbooks. The notes on cultivation must be the outcome of personal experience and should prove valuable. The first three chapters give simple sketches of the morphology and classification; of the life-histories of a few well-known types; and of the fossil Ferns, Pteridosperms and Bennettiteæ with reference to evolution of Cycads, Gymnosperms and Phanerogams. The text is illustrated with 33 process-blocks from original photographs.

A. G.

BOOK-NOTES, NEWS, ETC.

At the meeting of the Linnean Society on 13th December, Capt. Arthur W. Hill exhibited specimens of seeds enclosed in a stony endocarp and their germination, and by drawings on the blackboard explained the various modifications displayed. In certain genera the seed or seeds are protected by inclusion within a stony endocarp;

in such cases it is found that definite provision is made during the development of the fruit for the liberation of the seeds on germination from their stony envelope. In the case of *Prunus* and similar normally one-seeded fruits splitting apart of the two halves of the endocarp takes place, but in such 3–5-seeded fruits as *Canarium*, *Sclerocarya*, *Dracontomelon*, *Saccoglottis*, *Aubrya*, etc., special fenestræ or opercula are provided which are pushed away by the germinating embryo. In *Davidia* not only are special fenestræ removed but also portions of the intervening skeletal structure of the endocarp. The remarkable fruit of *Pleiogynium* encloses several seeds which germinate without any disintegration of the endocarp.

On Jan. 7, a special meeting of the same Society was summoned by circular to protest against the dismantling of the British Museum, including the Natural History Museum, for use as Government offices. The following Resolutions, which had been approved by the Council, were unanimously adopted:—

"The Fellows of the Linnean Society of London in Meeting assembled, desire to place upon record:—

"Their profound astonishment and alarm at the reported intention to dismantle the British Museum, including the Natural History Museum, in order to use it for Government offices: their emphatic protest at a procedure which must endanger priceless and irreplaceable possessions acquired at great cost and infinite labour during the last two hundred years, constituting the most splendid museum in existence and the recognised centre of systematic scientific research: their dismay at a resolution which may paralyze scientific activities that during the past three years have been devoted to work intimately connected with the prosecution of the war; and at the expenditure of a large sum in adapting unsuitable buildings, whilst other and more suitable accommodation might be provided at much less cost: and finally to emphasize the disgrace which must accrue to the Nation in the eyes of the world, by the evidence thus afforded of the inability of the Government to appreciate the essential value to the Nation of scientific assistance such as the British Museum has rendered and is capable of rendering."

At the meeting of the same Society on Jan. 17 a paper on "Some Early Cape Botanists and Collectors" was read by Mr. Britten, who, apologising for dealing with a subject which was biographical rather than scientific, claimed as precedent a paper read by J. E. Smith on "Some Norwich Botanists" in 1804—by a curious coincidence on the same day of the same month. Mr. Britten's remarks were mainly confined to the collectors represented in the Sloane and Banksian Herbaria now forming part of the National Collection in the Department of Botany of the Natural History Museum. He pointed out that these collections had been largely overlooked by writers on South African botany, but that even now when inspected by monographers they were found to yield species hitherto undescribed. The principal collectors of whom and of whose plants details were given were Paul Hermann (1640–1698); James Cunningham, who in 1699 sent Cape plants to Petiver, and made a short list of species adventive from Europe, which included two Mallows, *Euphorbia helioscopia*, *Mercurialis annua*, Fennel, and a Dock; Henry Bernhard Oldenland († c. 1698); Franz Kiggelaar († 1722); Franz Pehr Oldenburg († 1774); Francis Masson (1741–1805), one of the earliest collectors for Kew Gardens, whose plants, living and dried, made a very large addition to our knowledge of the Cape region, and whose drawings, also in the Department of Botany, contain many species not otherwise known; Carl Pehr Thunberg (1743–1828), who, on account of his botanical knowledge and published works, as well as for his collections, may be regarded as the most important figure in early Cape botany; Banks and Solander who visited the Cape in 1771; and Robert Brown (1773–1858) who touched at the Cape in the Flinders Expedition in 1801. In the discussion which followed the paper, Dr. Stapf, Dr. Daydon Jackson, and Sir David Prain took part, emphasizing the interest which attaches to the early records, to the investigation of which Mr. Britten had devoted much attention.

At the same meeting Mr. C. E. Salmon described and exhibited specimens of a hybrid *Stachys* which originated in his garden, where previously only *Stachys germanica* and *S. alpina* were cultivated; he compared the characters of all three plants, and pointed out that the hybrid was identical with *S. intermedia* Ait.

The South-Eastern Naturalist, "being the Transactions of the South-Eastern Union of Scientific Societies for 1917" contains a list of the fungi collected about Haslemere before and during the "fungus foray" of 1916 and a general report on the botanical work of the Union. Among the papers printed is one by Dr. Daydon Jackson on "Notable Trees and Old Gardens of London," and Mr. Boulger gives an extremely interesting account of "The Association of the Chelsea Physic Garden with the History of Botany," tracing this from its foundation in 1673 to the present day.

The recently issued part (vol. xxvii. pt. 2) of the *Transactions of the Botanical Society of Edinburgh* contains an enumeration of the Mosses of West Lothian, by L. C. Adam; Moss records for Selkirk, Peebles, and the Lothians by William Evans, who also contributes a note on insect visitors to *Corallorhiza innata* and other Orchids in the Forth District; and short notes on *Ceratophyllum demersum* in the Orkneys and *Ulex nanus* in Caithness by Arthur Bennett. Other papers are on *Sedum Praegerianum* (with two plates) and a tentative classification of the section *Rhodiola* by R. Lloyd Praeger; on *Cavea*, a new genus of *Compositæ* from East Himalaya (with plate) by W. W. Smith and James Small; on Rhododendrons of the *Irroratum* series, containing descriptions of several new species, by Prof. Balfour, who also has a note on Rhododendron seedlings; and a description of *Bulbophyllum Imogeniæ*, a new Orchid from Nigeria, by Kenneth Hamilton.

THREE APPARENTLY UNDESCRIBED IRISH SAXIFRAGES.

By the Rev. E. S. Marshall, M.A., F.L.S.

1. **Saxifraga Drucei**, mihi, n. sp.—Planta delicatula, villosissima, pallide viridis (sæpius viridi-lutescens), densissime vel plus minus laxe cæspitosa. Surculi prostrati, graciles, subunciales, cultura interdum biunciales. Folia, præsertim in marginibus, pilis albis crispulis articulatis multis hyalinis tecta; surculorum trifida, inferiora longius petiolata, laciniis linearibus lineari-lanceolatisve, acutis aut apiculatis: rosularum numerosa, conferta, surculinis similia, at nonnunquam obtusiuscula; caulina 2–4, distantia, inferiora trifida (rarissime quinquefida), subsessilia, laciniis suberectis linearibus acutis vel calloso-apiculatis, intermedia 2–3-partita (aliquando indivisa), superiora simplicia, linearia vel anguste lanceolata. Caules 2–4-unciales (in planta culta staturam 6–7-uncialem attingere possunt), graciles, albo-pubescentes, intermixtis (præcipue apicem versus) pilis glandulosis. Flores 2–4 (in horto 2–6), pro majori parte terminales, breviter pedicellati, at in exemplis floribundis prope basin vel ad medium caulis oriundi, longius (usque ad sesquiunciam) pedicellati, atque 1–2 bracteis linearibus præditi. Calyces late campanulati, lobis triangularibus acutis aut apiculatis, superne corneo-marginatis, glandulosi, pilosiusculi, demum glabrescentes. Petala candida, 3- (rarius 5-) venosa, calyce triplo longiora, obovata, integerrima, apice rotundata. Antheræ mediocres, siccitate oblongæ vel ovato-oblongæ. Capsulæ cornua gracilia, fructifera divergentia.

Plant rather delicate, very villous, pale green (frequently yellowish-green), very densely, or more or less loosely tufted. Barren shoots prostrate, slender, about an inch long, sometimes two inches, in cultivation. Leaves, especially on their edges, covered with many white, rather curly, jointed, glass-like hairs; those of the barren shoots trifid, the lower rather long-petioled, with linear or linear-lanceolate, acute or apiculate segments: those of the rosettes numerous, crowded, similar to those of the barren shoots, but occasionally bluntish; stem-leaves 2 to 4, distant, the lower ones trifid (very rarely 5-fid), subsessile, with suberect, linear, acute or callose-apiculate segments, the intermediate ones 2–3-partite (sometimes undivided), the upper ones simple, linear, or narrowly lanceolate. Stems 2 to 4 inches (they can reach a height of 6 or 7 inches, in the cultivated plant), slender, white-hairy, with an admixture (especially towards the top) of glandular hairs. Flowers 2 to 4 (2 to 6, in the garden), mostly terminal, shortly pedicelled, but in many-flowered specimens springing from near the base or about the middle, with longer pedicels (up to an inch and a half), furnished with 1 or 2 linear bracts. Calyces broadly campanulate, with triangular, acute or apiculate lobes, which are horny-bordered upwards, glandular, somewhat pilose, at length glabrescent. Petals pure white, 3- (more rarely 5-) veined, thrice as long as the calyx, obovate, quite entire, rounded at the tip. Anthers medium-sized, oblong or ovate-oblong, when dry. Horns of capsule slender, divergent in fruit.

Exsiccata :—Herb. Marshall, Nos. 3651, 3654, 3657, 3658, 3659, 3900 (this is 3651, cultivated).

I have seen no specimens at all closely resembling *S. Drucei* in either public or private collections, with the exception of material collected by Mr. G. C. Druce, in 1906, and cultivated the following year; these were labelled as *S. Sternbergii* Willd., but cannot be referred to that species, which is bright green, glabrescent, with very different foliage, sepals, and petals. I saw it on the upper part of Brandon Mountain, S. Kerry, in several places, from about 2800 feet to the summit (3127 feet), in July, 1911, and have grown and studied it ever since. Most likely it will be found in other Kerry stations; perhaps, also, on the Galtees, &c., where *S. hirta* Sm. occurs.

My root (No. 3900=3651) forms a very close tuft, and is now about six inches across; but some wild gatherings are a good deal more straggling in habit. The petals tend to be orbicular-ovate, on first expansion: but their average shape is (as described) obovate.

S. Drucei seems best placed next to *S. incurvifolia* D. Don (in the group of *S. cespitosa* L.); but that has deep green, glabrescent leaves, &c., and forms smaller, more crowded tufts. Grown side by side, these two are obviously distinct at all seasons (the Kew "*S. incurvifolia*," kindly sent by the Curator last May, has not yet been seen by me in flower, but is extremely hairy, and can hardly be D. Don's species). *S. hirta* Sm. is grey-green, much more villous, laxer in habit, with very different foliage and sepals, and larger petals.

2. S. Sternbergii Willd., n. var. gracilis, mihi.—A typo constanter differt habitu rigidiore: foliorum segmentis linearibus vel lineari-lanceolatis, acutis, aut etiam acuminatis; necnon sepalis angustioribus, acutissimis, pro more apiculatis.

Differs constantly from the type by its more rigid habit: by its leaf-segments being linear or linear-lanceolate, acute, or even acuminate; and by its narrower, very acute, as a rule apiculate sepals.

Exsiccata :—Herb. Marshall, No. 4406.

Habitat :—Black Head (*R. P. Murray*; *H. C. Levinge*; *S. H. Bickham*) and Ballyvaughan (*H. C. Levinge*), Co. Clare; Brandon Head, S. Kerry (*Arnold Elliott*, through *H. S. Thompson*). Doubtless it occurs elsewhere, as it appears to be the prevailing Irish form of the species.

Some of the wild specimens are much crowded, and bear very numerous flowering stems; I think that such is usually the case (more or less) in this variety. My No. 4406 (from Mr. Bickham), grown for about a dozen years under a north wall, is much drawn-out, and represents a "forma *umbrosa*." The Brandon Head plant, likewise cultivated, is remarkable for its oval-oblong petals, tinged with pink, which I have not seen in any other example of this species. Mr. Murray's, grown on a sunny rockery at Shapwick Vicarage, was referred, in 1889, to Professor Babington, who wrote as follows:—"I think I may call it *Sternbergii*=*hirta* of Smith, *E. B.* 2291." This identification is certainly erroneous; the latter, of which I have seen authentic material, being entirely different. Mr. J. G. Baker's comment was:—"Nearest to *decipiens*, but not exactly that; certainly not true *cæspitosa* of Iceland, but shading off from *sponhemica* and *decipiens* towards *cæspitosa*." I may here mention that several sheets of true *S. hirta* Sm. in the Cambridge Herbarium are named *S. Sternbergii*—in Mr. Baker's handwriting, if I remember aright. This Shapwick garden specimen agrees very well with my more straggling wild ones from Black Head.

3. S. HYPNOIDES, L., n. var. ROBUSTA, mihi.—Planta speciosa, procera, quam in typo eximie robustior. Caules crassi, semipedales (cultura spithamæi vel etiam pedales). Floribunda (in statu silvestri sæpe 5–7-flora, in horto 5–10-flora); petala permagna, rotundo-ovata, calycem triplo superantia: calyces quam in typo subduplo-majores, lobis latioribus. Capsulæ majores. Surculi cultura longi (semipedales et ultra); folia inferiora aliquando ternata (vel infima quinata), magna, rigida, lobis lineari-lanceolatis, neque, ut in typo, anguste linearibus: superiora longiora, falcato-recurva. Folia caulina inferiora trifida (interdum quinquefida), magna vel majora, rigida.

A handsome, luxuriant plant, decidedly stronger than the type. Stems stout, six inches (in cultivation eight inches, or even up to a foot) high. Free-flowering (often 5- to 7-flowered, in a wild state, 5- to 10-flowered, in the garden); petals very large, roundish-ovate, thrice as long as the calyx: calyces about twice as large as in the type, with broader lobes. Capsules larger. Barren shoots long, in cultivation (six inches, or more); their lower leaves sometimes ternate (or the lowest quinate), large, rigid, having the lobes linear-lanceolate, and not narrowly linear, as in the type: the upper ones longer, falcate-recurved. Lower stem-leaves trifid (sometimes five-cleft), large, or rather large, rigid.

Exsiccata:—Herb. Marshall, No. 4033.

Habitat:—Black Head, Co. Clare, *H. C. Levinge*; also seen, from the same locality, in Mr. Druce's collection.

My cultivated No. 4033, originally gathered by Mr. R. Ll. Praeger, was received through Mr. Hunnybun, several years ago, and keeps very constant, as does the typical form, from Cheddar, grown within a few yards of it. Mr. Levinge's wild specimen is much more compact, with shorter barren shoots; but it evidently came from an exposed situation (being thus a "forma *aprica*"), and was collected too early—on May 19th, 1892—for these to have reached their full development. It is already gemmiferous, whereas in No. 4033 the axillary buds are imperfect, or often absent; but that character is normally rather uncertain.

I have seen nothing like this variety, which is almost distinct enough to deserve subspecific rank, from Great Britain or the Continent; but it should occur elsewhere on the limestone in W. Ireland. I cannot ascertain the exact locality whence No. 4033 was obtained, but suspect that it came from Black Head.

Dr. H. O. FORBES'S NEW GUINEA RUBIACEÆ.—I.

By H. F. Wernham, D.Sc., F.L.S.

The plants described in the present paper, to be followed, it is hoped, by others covering the whole series, were collected by Dr. H. O. Forbes, F.R.G.S., in the years 1885–6. In 1885 an expedition was organized, under this gentleman's leadership, with the object of investigating the orography and natural history of the Owen Stanley Range, some twenty miles to the north-north-east of Port Moresby, in British New Guinea. This range was named by the late Professor Huxley, who had first sighted it from the deck of H.M.S. *Rattlesnake* commanded by Captain Owen Stanley, as well as Mount Victoria—originally named after Huxley by Dr. Forbes, the first to explore it. The whole costly equipment for the expedition, which was generously subsidized by several learned societies, was lost, on the 26th of July, 1885, in the accidental wrecking of a lighter in the roads off Batavia. Dr. Forbes refitted the expedition in Brisbane, and a fresh start was made under the auspices of Sir Peter Scratchley, the new Governor of New Guinea; Port Moresby was reached on the 31st August, and a substantial base-camp was established, and occupied on the 1st October, in the region of Mount Sogere, at about 2000 feet above sea-level and 25 miles from the coast. Owing to a host of adverse circumstances, prefaced by the disaster just described and culminating in the death of Sir Peter Scratchley, who was more than favourably disposed to the expedition, the latter proved a failure. After seven months' occupation the camp, which had grown by then to the proportions of a village and included the substantial beginnings of a horticultural and botanical garden, had to be abandoned. The camp was raided later by hostile natives, and the bulk of Dr. Forbes's valuable collections was destroyed. The object of the present papers is to furnish the names and descriptions of what is the mere residue of a comprehensive collection of plants of the Sogere district. The types of new species are preserved in the National Herbarium.

Nauclea tenuis Haviland, in Journ. Linn. Soc. (1897) xxxiii. 55. Large tree, with young fruit pale green. Mt. Gawada, 5000 feet. Fr. January. No. 535!

N. Chalmersii F. v. Muell. Not. Pap. Pl. 8. Large shrub or small tree. Sogere, 2000 to 2500 feet. Nos. 8! 191!

Uncaria Forbesii, sp. nov.

Frutex scandens ramulis gracilibus nisi novissimis minute appresse pubescentibus glaberrimis sulcatis, cortice striato-rugosulo indutis. *Folia* crassiuscule chartacea, supra nitentia, utrinque nisi in venarum axillis minute necnon sparse barbellata glaberrima, elliptica breviuscule acuminata apice obtusissima basi acuta; petiolus longiusculus glaberrimus; venæ primariæ laterales utrinque 6–7, qua centralis subtus prominentes supra impressæ dilutiores subvariegatim discolores. *Stipulæ* caducissimæ. *Capitulæ* in axillis solitariæ, in pedunculis breviusculis minute sericeo-pubescentibus dispositæ. *Fructus* fusiformes longe pedicellati sublæves minute appresse griseo-pubescentes, a *calycis* lobis conspicuis oblongis coronati apice rotundatis pro rata longiusculis, albovirides.

Mt. Meroka, 2500 ft. Fr. April. No. 906!

"A climber. Fruit whitish green." A flowering branch 24 cm. long is barely 3 mm. *Leaves* 9 cm. × 4·5 cm.; petiole 1·5 cm. long. *Peduncles* articulated to short axillary branches about the same length, that become later grappling-hooks, 1·5 cm. long; pedicels 5 mm. or even longer; *fruit* about 1·5 cm. long, 2·5 mm. in the thickest part. *Calyx* 2 mm. long, the lobes occupying about two-thirds of this length.

Distinct in the rather striking colouring of the leaf and veins, differing from *U. attenuata* Korth., its nearest ally, in the glabrous leaf-surface, the shape of the calyx-lobes, and the un-ribbed, smooth fruits.

U. pedicellata Roxb. Fl. Ind. i. 520.

A climbing shrub, with greenish-gamboge flowers. Sogere hills, 2000 feet, 20 October. No. 104!

U. ferrea DC. Prod. iv. 348. No. 863!

Dolicholobium Forbesii, sp. nov.

Frutex magnus, ramis foliorum deciduorum cicatricibus densissime obovatis ad ellipticis notatis, crassis, fere ad apicem cortice rugoso lignoso indutis, novissimis obscure ferrugineo-pilosis. *Folia* papyracea utrinque in maturitate glaberrima, subtus discoloria, utrinque subtus præsertim venis primariis (lateralibus 9) conspicuis reticulatione transversa subtus notabili, plerumque in ramulorum apicibus dense aggregata, petiolata, oblanceolata, brevissime acuminata basin versus in petiolum modestum leviter angustata; *stipulæ* magnæ coriaceæ longe oblongo-lanceolatæ dorso densissime aureo-sericeæ. *Flores* albi in umbellis axillis in superioribus ±4-floris dispositi pedunculatis, bracteis caducissimis, pedunculis stipulis subæquantibus graciliusculis, qua pedicelli rufo-hirtellis tenues laterales æquilongi. *Calyx* tubularis truncatus extus aureo-sericeus limbi margine ciliato-piloso, vix ovarii in anthesin dimidium æquans longe cylindrici basi turbinati. *Corollæ* tubus breviter e calyce exsertus validiusculus extus appresse griseo-pubescens, lobis patentibus oblongis apice obtusissimis, intus lævibus glaberrimis fuscis, extus argenteo-sericeo-pilosis. *Fructus* longissimus teres lineari-cylindricus angustissimus, minutissime obsolete papilloso-pubescens, in siccitate ferrugineus, a calycis parte basali persistente ciliato coronatus, basi leniter angustatus. *Semina* planata elliptica, alis longis angustis onusta duobus subsetaceis.

Mt. Gawada, 3000 feet. No. 853!

Distinguished from its most nearly allied species, *D. oxylobum* K. Sch. and Laut., especially in the sharply truncate calyx. *Leaves* 14–21 cm. × 5–7 cm. broad above the middle; petiole 1–1·5 cm. long; *stipules* nearly 3 cm. long and 7 mm. broad. *Peduncle* up to 3 cm. long; *pedicels* of the middle flowers very short, of the lateral flowers 2–2·7 cm. *Calyx* 5 mm. deep, 3 mm. wide at the mouth; *ovary* 1·4 cm. long, 2·5 mm. in diameter of the cross-section. *Corolla*-tube exserted 3 mm. beyond the calyx, 3 mm. wide at the mouth; lobes 1 cm. long, 2·5 mm. broad. *Fruit* 8 cm. or longer, 4 mm. thick. *Seeds*, measured along and including the wings, 4 mm. or longer.

Xanthophytum papuanum, sp. nov.

Frutex erectus ramulis necnon novitatibus omnibus densissime rufo-pilosis, pilis subsericèis subappressis. *Folia* tenuiter membranacea, anguste elliptica apicem necnon basin versus longe acuminata acuta, longe petiolata, in maturitate glabra, superiora tamen in venis plus minus sparse rufo-sericeo-pilosa, petiolo gracili similiter induta; *venæ* primariæ utrinque conspicuæ approximatæ supra præsertim prominulæ, laterales utrinque ad 18 v. plures; *stipulæ* membranaceæ persistentes triangulares, apice in acumen longum setaceum productæ, extus glabrescentes intus appresse pilosæ. *Flores* in cymulis globosis densifloris aurato-sericeis dispositi axillaribus petiolos vix æquantibus, pedunculo gracili cymulum subæquante. *Bracteæ* plerumque lanceolatæ basi irregulariter trifidæ necnon hirsuto-pectinatæ apice longe et acute acuminatæ, costa centrali conspicua; *bracteolæ* bracteis similes nisi multo minores necnon angustissimæ lineares. *Calycis* lobi 5 inæquales, pilis subrigidis pro rata magnis rufo-ferrugineis onusti lanceolati. *Corolla* fere ad basin in lobos 5 divisa subscaphoideos crassos anguste ovato-oblongos apiculatos dorso apicem versus rufo-barbatos. *Stamina* 5, antheris brevibus oblongis dorsifixis, filamentis brevissimis crassiusculis. *Fructus* extus basin turbinatum versus rufo-hirsuti valvæ 2 post dehiscentiam spiraliter torsæ, placentam linearem sublongatam persistentem reliquentes erectam; *semina* hemi-cylindrica quadrangularia nec numerosa.

Mt. Woriwori, about 5000 feet. No. 769!

An erect shrub, with dirty-greenish white flowers. *Leaves* 10–18 cm. × 3·5–5 cm., with petiole to 3 cm. long; *stipules* 1·5 cm. or longer (including seta), 4–7 mm. broad above the base. *Peduncle* 1 cm. or rather longer; flowering head 1·5 cm. in diameter. *Bracts* ±12 mm. long, and 4 mm. wide above the base. *Calyx*-lobes up to 2·5 mm. or longer; disc fleshy, conspicuous, depressed-hemispherical, punctulate. The *corolla* is inconspicuously small, apparently not exceeding the calyx; but those examined were immature. *Fruit* 3 mm. long.

This species is related to the Fijian *X. calycinum* Benth. & Hook., but is distinct in being a much larger and coarser plant, with relatively very short fruiting peduncles.

Mussænda macrantha Val. in Nov. Guin. viii. 456. A spreading shrub with cream-yellow fruits. Sogere, 2500 feet. *Fr.* October. No. 30! 207!

Mussænda Scratchleyi, sp. nov.

Frutex parvus glaberrimus, ramulis quadrangularibus necnon complanatis. *Folia* firme papyracea, orbiculari-elliptica apice brevissime acuminata subacuta, basi plus minus subito acuta, petiolo longiusculo complanato, supra glabra subtus in venis sparse minute hirta, venatione utrinque notabili, venis præsertim primariis prominulis lateralibus utrinque 7–9; *stipulæ* triangulares acute acuminatæ, extus pilis dilute flavis pro rata majusculis appressis densissime onustæ hirtis. *Flores* aurantiaci inter minores subsessiles, extus glaberrimi, cymis in multifloris subcorymbose laxiuscule dispositi, peduncellis primariis conspicue elongatis quadrangularibus subterminalibus, basi subito contractis; *bracteæ* setaceæ inferiores longiusculæ. *Calyx* breviter spinuloso-dentatus in ovarium angustum desinens basi leniter angustatus; dentis in loco sæpe lamina anguste elliptica onustus petaloidea, basi in petiolum gracilem longum attenuata, apice parum acuminata, subglabra flava. *Corollæ* glaberrimæ tubus gracilis, infra medium staminum in regione dilatatus, insuper leniter nec tamen multo oblonge limbum patentem versus inflatus, lobi breves triangulari-ovati breviter apiculato-acuminati apicem versus præsertim flavo-barbellati.

Sogere. No. 5!

I have named this species in honour of General Sir Peter Scratchley, the first governor of our possessions in New Guinea, whose keen interest in this expedition led him to visit the locality in person, and to promise a generous subsidy—a promise which, unfortunately, was not ratified by his successor after Sir Peter's sudden death a few months later. This species is remarkable for its almost completely glabrous inflorescence, the nearly orbicular leaves and chaffy stipules, short calyx-lobes, and small corolla. *Leaves* 12–15 cm. × 7–9 cm., with stalks to 3 cm. or longer: *stipules* 6 mm. × 4 mm. (at base). Tube of *calyx*-limb, in mature flower, about 1 mm. long, the teeth about the same length; ovary 5 mm. long; petaloid calyx-lobe, 4–5 cm. × 2–2·5 cm., with stalk 1–1·5 cm. long, *Corolla*-tube 2·2 cm. long; limb 8–10 mm. in diameter. A small shrub with orange flowers.

Lucinæa Forbesii, sp. nov.

Frutex glaber, ramulis gracilibus striatis teretibus. *Folia* subcoriacea parva elliptica acuminata nonnunquam caudata apice subacuta basi acuta, petiolo longiusculo gracillimo; venæ primariæ utrinque prominulæ, lateralibus utrinque 5, reticulatione subtus præsertim interveniente notabili; *stipulæ* late brevissime vaginantes brevissime necnon acuminatæ apice acutæ, plus minus persistentes. *Capitula* pedunculis in axillaribus brevissimis disposita rigidiusculis validiusculis pubescentibus, ca. 14-flora; in *fructu* fusco-viridi nitentia, calyce obscure obtuse lobulato coronato persistente.

Mount Woriwori, about 5000 feet. No. 712!

Although no flowers are present, the sole specimen being in fruit, its characters differ fundamentally from those of any species described previously. Notable features are the large fruiting heads, nearly 2 cm. in diameter, on short peduncles only a few millimetres long at most, and the shining leathery *leaves*, 6–8 cm. × 2·5–3·3 cm., with very slender stalks, 1 cm. or more in length.

UROPHYLLUM. This genus is represented by a large number of species in the Peninsula and islands of Malaya, but only four have been recorded for New Guinea—three from the Dutch (western) territory, and one from the German, Kaiser Wilhelmsland, in the northeast. Dr. Forbes collected the following large-leaved species upon three of the mountains in the district; it differs radically from any of those previously described.

Urophyllum britannicum, sp. nov.

Frutex magnus subscandente vagans nonnunquam arbor, ramulis complanatis sulcatis ferrugineo-pubescentibus tarde glabrescentibus. *Folia* majuscula firme chartacea, oblonga utrinque acuminata apice longe caudata, petiolo modico dense pulverulento-pubescente, supra glaberrima subtus in venis patente ferrugineo-pubescentia, venis primariis supra impressis subtus prominulissimis, lateralibus utrinque 12–14; *stipulæ* anguste lanceolatæ longe acuminatæ apice subulatæ, dorso nonnunquam valide carinatæ, pilis brevibus patentibus indutæ. *Flores* latiusculi breves pro genere inter majores, albo-virides, laxiuscula in panicula abbreviata axillari nec multiflora dispositi, in novitate densissime rufo-pilosa tardius pubescente, pedunculis pedicellisque post anthesin elongatis; *bracteæ* subulato-setaceæ parvæ. *Calyx* dentibus 5 anguste triangularibus acutissimis, in fructu erectis tandem inflexis. *Corollæ* parum e calyce exsertæ extus glabræ lobi late ovati subacuti vix acuminati. *Bacca* 5-locularis pisi forma et magnitudine late sulcata.

Sogere: A fair-sized tree with greenish-white flowers, 23 October, 1750 feet. No. 248! Also nn. 330! 930! and an unnumbered specimen. Mt. Korkoko: A rather large shrub with very pale green flower-buds, 27 January. 2500 feet. No. 627! A straggling shrub, with green fruits, 18 March. No. 787! Mt. Meroka: a small tree, with pale green fruit, 6 January. No. 366! At 4000 feet, a tree, no. 346! *Leaves* 15–25 cm. × 4–7 cm.; petiole 1–2 cm. long; *stipules* with short ovate base, 4 mm. broad, the whole 1·5 cm. long. *Inflorescence* about 3 cm. long at first, and 6 cm. in the fruiting stage; peduncles, to 2 cm. or longer; *bracts* up to 4 mm. long; pedicels 1 cm. or longer in fruit. *Flower* barely 4 mm. long. *Fruit* 7 mm. in diameter.

Similar in habit to the preceding, and abundantly represented also in the Malayan region, is the genus LASIANTHUS.

This is represented at present in New Guinea by seven recorded species. It differs from *Urophyllum* much as *Ixora* differs from *Tarenna*, namely, in the presence of one ovule in each loculus of the ovary, instead of several. The material in the two species described below is very deficient in the reproductive portion, this being represented by one or two fruits, mostly immature. But they are easily distinguishable by the vegetative characters.

Lasianthus sogerensis, sp. nov.

Frutex inter minores pilosissimus, novitatibus densissime patente sericeo-pilosis, ramulis valde complanatis mox tamen teretiusculis, pilis patentibus breviusculis densissime indutis validiusculis. *Folia* inter minores firme chartacea, oblonga acuminata acuta basi rotundata, subsessilia v. petiolo brevissimo valido qua ramuli induto, supra nisi vena centrali dense patente hirto-pilosa sparse hirta, subtus in venis pilis breviusculis sericeis patentibus onusta, demum ferruginea, margine ciliata, apice pilis similibus dense sæpe barbata; venæ primariæ supra nisi centralis obscuræ, subtus prominentissimæ, laterales utrinque 9–11; *stipulæ* qua ramuli proximi indutæ, basi breviter oblongam in vaginam cohærentes, insuper duobus in brachiis lineari-lanceolatis setaceis protractæ acuminatis. *Fructus* 2-pyrenus, alaribus in stirpibus occlusus sessilis subsolitarius, dense pilosus, calycis persistentis lobis setaceis basi linearibus coronatus.

Sogere, 3000 feet. A small shrub with deep azure-blue fruits, 30 October. No. 313! *Leaves* 7–10 cm. × 2–4 cm.; *stipule*-sheath 3 mm. deep, the two "prongs" about 8 mm. long. *Fruit* 6 mm. across, roughly orbicular and flattened, 5·5 mm. in depth, the calyx-lobes 2·5 mm. long.

Allied, apparenly, to *L. montanus* King and Gamble, from which it differs in the indumentum of the leaves and the stipules with two long prongs.

Lasianthus canephoroides, sp. nov.

Frutex inter minores, ramulis gracilibus dense appresse fulvo-pubescentibus nec glabrescentibus, petiolis, stipulis, necnon foliorum venis subtus simile indutis. *Folia* inter minores, firme pergamacea subcoriacea, elliptica acuminata apice acuta, basi vix acuminata tamen acuta, supra subnitentia necnon subtus inter venas glaberrima; venæ primariæ supra vix conspicuæ subtus prominentissimæ lateralibus paucæ (utrinque 5–6), petiolo brevi sed manifesto; *stipulæ* in vaginam brevissimam connatæ insuper brevissime triangulariter apiculatæ inconspicuæ sæpius vix manifestæ. *Fructus* solitarius in axillis sessilis, appresse (in juventute) pubescens, dentibus calycinis brevibus 5 subulatis coronatus.

Sogere, 2000 feet. A small shrub with rich azure-blue fruits, 22 October. No. 203! *Leaves* 4·5–8 cm. × 2–3 cm., with petiole 3 mm. long at most. Allied to *L. lucidus* Bentham, from which it is distinct in the indumentum of the vegetative parts, and the small fruits crowned with short calyx-lobes.

Tarenna hameliæblasta, sp. nov.

Frutex majusculus scandens, ramulis gracilibus subteretibus densiuscule pubescentibus, tardiuscule glabrescentibus, demum subquadrangularibus. *Folia* firme chartacea subcoriacea, notabiliter elliptica basi rotundata apice necnon brevissime subitoque acuminata obtusa, supra nisi in venis centrali præsertim hirtello-pubescentia glabra, subtus in venis sparsiuscule hirta aliter glaberrima; venæ primariæ supra corrugato-impressæ, subtus valde graciliter prominentes, laterales utrinque 3 alternantes, reticulatione interveniente prominulissima; petiolus longiusculus subteres, ferrugineo-pubescens: *stipulæ* parvæ tamen conspicuæ, persistentes, triangulares, breviter subsetaceo-acuminatæ. *Flores* 5-meri albi in cymis amplis trichotomis dispositi multifloris laxiusculis, cymulis ultimis corymbosis ± 7-floris, terminalibus v. nonnunquam axillis in superioribus oriundis, ramis dense ferrugineo-hirtellis complanato-sulcatis; *bracteæ* setaceo-lineares parvæ. Pedicelli plerumque manifesti 2-bracteolati. *Calyx* cum ovario subglobosus, lobis ovato-oblongis, extus omnino dense pilosus. *Corollæ* tubus rectus graciliusculus inter breviores, extus dense pilis ascendentibus pubescens, lobi anguste oblongi patentes subacuti, dorsi sparse in medium griseo-pubescentes, aliter glabri, tubum excedentes, intus staminum in regione pilis griseis onustus reflexis. *Antheræ* cum parte filamentorum superiore necnon stylo exsertæ, graciliter

lineares; filamenta qua corollæ tubi pars superior intus pilis argenteis rigidulis densiuscule onusta.

Korkoko ranges, 2800 feet, 19 March. No. 807! Mt. Woriwori, 5000 feet. No. 728!

A large climber, with white flowers, remarkable for the accurately elliptical leaves, and pale green, angular flower-buds. *Leaves* 7–10 cm. × 3·7–5·5 cm., with stalk 8–13 mm.; *stipules* at length chaffy, more or less truncate above, 3 mm. × 2·5 mm. wide at base. *Inflorescence* a depressed trichotomous thyrsus, 10 cm. long, reckoning the terminal peduncle, some 4 cm. long, and 14 cm. broad at base. *Calyx*-lobes 2 mm. long, the ovary 2·5 mm. deep. *Corolla*-tube 7·5 mm. long; lobes 9 mm. × 2·5 mm. *Anthers* 7 mm.; *style* 16 mm.

Randia ixoræflora, sp. nov.

Arbor subglaber, ramulis gracilibus internodiis longis, novellis nonnunquam obscure pubescentibus, conspicue striatis. *Folia* inter minora, firme chartacea, elliptica apice acuminata sæpe obtusa basi acuta, utrinque glabra; *venæ* nisi primariæ quarum laterales utrinque raro usque ad 5 inconspicuæ: *stipulæ* parvæ triangulares aristato-acuminatæ. *Flores* in cymulis paucifloris laxe dispositi ramulos breves laterales terminantibus, foliis multo brevioribus; pedicelli minute pubescentes complanati striati, longiusculi. *Calyx* anguste infundibularis extus appresse necnon breviter griseo-pubescens, limbo brevissime acute 5-dentato. *Corollæ* tubus gracilis extus glaberrimus insuper sub lobos infundibulariter dilatatus, lobi utrinque glaberrimi, elliptico-ovati apice rotundati, tubi dimidium subæquantes longitudine.

Sogere, 2800 feet. Fl. 22 October. No. 180! 89!

Allied to *R. fasciculata* DC., from which it differs especially in its very short calyx-teeth, and in habit. It is a tree, some 50 feet high, with pale cream-yellow flowers. *Leaves* 6–10 cm. × 3·5–6 cm.; petiole to 6–7 mm. long; *stipules* 3 mm. long. *Peduncle* 4–6 mm. long; *pedicel* 5 mm. or longer. *Calyx* (with ovary) 6 mm. long, 3 mm. wide at mouth, with minute but manifest teeth. *Corolla*-tube 2·6 cm. long, the funnel-shaped part at the top occupying 6–7 mm. of this; lobes 1·2 cm. × 7 mm. *Anthers* narrowly linear, 6 mm. long, the tips just reaching the mouth of the tube. *Style* bluntly and shortly bifid at the apex, equalling the corolla-tube.

Randia anisophylloides, sp. nov.

Ramulis validiusculis rectis subteretibus ferrugineo-pubescentibus mox glabrescentibus. *Folia* majuscula crasse chartacea, obovata basin versus longe acuminata cuneata, petiolo valido tamen brevissimo subobsoleto, supra nisi in vena centrali obscure necnon sparse hirto glabra, venis impressis, subtus dense ferruginea velutino-pubescentia, venis primariis prominentissimis, lateralibus utrinque 10–11: *stipulæ* pro rata parvæ ovatæ aristato-acuminatæ acutissimæ, dorso valide carinatæ. *Inflorescentia* axillaria abbreviata, in fructu pedunculo valido lignoso; *fructus* subglobosus basi turbinatus, pubescens necnon glabrescens, bilocularis.

Mt. Sogere. No. 626!

Although the material includes but two fruits beside a portion of the shoot, there is but little doubt that this species has not been described before. It belongs to the section *Gynopachys*, and is allied to *R. anisophylla* Jack. The most distinctive characters are the almost sessile *leaves*, 20–30 cm. long and 10–14 cm. wide; considerably above the middle, in most cases; also the shape of the *fruit*, which is attenuate at the base, 3·5 cm. high and 2·5 cm. in diameter. The whole fruiting branch (exclusive of the fruit itself) does not exceed 2·6 cm. The *stipules* are shortly sheathing at the base, 1 cm. long and 7 mm. wide.

Randia, sp.

No. 40! collected, in fruit, in the middle of October at 2500 feet, is apparently allied to the preceding, but the material is inadequate for certain description.

Gardenia Gjellerupii Val. in Nov. Guin. viii. 758.

Sogere. No. 467!

Gardenia tropidocarpa, sp. nov.

Arbor inter majores, omnino nisi corolla novitatibus ipsis glaberrimus, glutinaceo-nitens, ramulis validis, junioribus complanatis obtuse angulatis sulcatis, in siccitate nigrescentibus. *Folia* majuscula firme pergamacea. supra nitentia, elliptica brevissime obtuse acuminata basi acuta, petiolo angulato-complanato longiusculo; venæ primariæ utrinque prominulæ, laterales utrinque ca. 12, reticulatione interveniente præsertim subtus notabili: *stipulæ* demum alte in vaginam subscarioso-membranaceam connatæ parte inferiori longiuscule persistente, insuper oblongo-triangulares subito late truncatæ necnon brevissime sinuato-2–3-dentatæ. *Flores* terminales solitarii majusculi, *ovario* anguste infundibulari, basin in pedicellum brevem insensim desinente, validissime necnon acutissime carinis 5–6 prominentissimis onusto, insuper *calyce* coronato fere ad basin in lobis magnis foliaceis ovato-lanceolatis diviso longe acuminatis apice obtusis, persistente. *Corollæ* tubus rectissime angustus insuper brevissime sub lobos latissime subito dilatatus, extus minute subcrystallino-pubescens, canaliculatus, parum calycem longitudine excedens, intus infra staminum pubescens, lobi ± 8 obovato-lanceolati, tubum fere æquantes basin versus tubo in junctionem latum leniter acuminati, apice rotundati minute apiculati. *Stamina* in ore inserta antheris linearibus parte superiore (vix longitudinis quarto) exserta cum *styli* apice valide obconice incrassato, obtuse ± 8 breviter partito stigmatifero. *Fructus* (n. 738) 5-valvatus late ovoideus ovarii carinis jam alis brevibus formantibus tamen conspicuis, endocarpio crustaceo-lignoso. *Semina* numerosissima valde complanata elliptica testa minute necnon manifeste foveolata.

Mt. Woriwori, about 5000 feet. *Fr.* Feb., no. 738! *Fl.*, no. 926!

A large tree, evidently abounding in mucilaginous matter, with yellowish-green fruit. *Leaves* 11–20 × 6–10 cm.; petiole 1·5–2·5 cm. *Stipule* just below a terminal flower, 7 mm. long, 6–7 mm. broad above the base; the oblong sheath occupies nearly 3 mm. of this length, the upper, free portion gradually narrowing to the truncate apex, which is 4 mm. wide. Older stipules with sheath up to 1 cm. long, and ragged free part about 8 mm. long. *Ovary* 1·6 cm. long, 6 mm. wide above, gradually passing into the *pedicel*, 1 cm. long. *Calyx*-lobes 2·3 cm. × 7 mm. *Corolla*-tube—the slender tubular part 2·5 cm., 3–4 mm. broad; upper, inflated part, about 3 mm. deep, and 1 cm. wide immediately under the lobes; lobes about 2·5 cm. long, 1·1 cm. broad, above the middle, and 3 mm. at the truncate base. *Anthers* about 1 cm. long. *Style* (including stigmas) 3·5 cm. long. *Fruit* over 3 cm. long, exclusive of the persistent calyx, which is not at all accrescent, and 2 cm. in diameter across the middle.

This species is allied, apparently, to *G. carinata* Wall., of the Malay peninsula, but is easily distinguished by the leaf-shape, the shorter corolla-tube, and glabrous ovary.

Beside the preceding *Randia* and *Gardenia* species, in which there is but little or no doubt of the genus, the following may be either of one or the other, the material available being insufficient:—

Randia, or *Gardenia*. No. 808! A great tree, with bright green fruit. Korkoko ranges, 2900 feet. *Fr.* 19 March.

No. 339! probably of § *Gynopachys*, allied to *R. densiflora* Benth., but distinct in the large fruit, subcordate, coarsely sulcate, with a blunt rib running along the rather depressed and flat top, and down either side. The fruit is 4·5–5 cm. deep, and about the same along the top, the widest part.

Plectronia caudata Val. in Nov. Guin. viii. 478. A small tree with green fruits. Meroka, 2500 feet. *Fr.* April. No. 889!

Pavetta tarennixora, sp. nov.

Verisimiliter frutex, ramulis cortice membranaceo squamoso indutis valde quadrangularibus necnon sulcatis. *Folia* membranacea obovata basi cuneata apicem versus breviter acuminata, petiolo brevi tamen manifesto, utrinque nisi subtus in venis prominulis primariis hic inde obscure hirtella glabra, venæ primariæ laterales utrinque ca. 7–8. *Flores* 4-meri parvi in paniculis corymbosis multifloris necnon laxiusculis dispositi terminalibus v. axillis in superioribus oriundis amplissimis, foliis brevioribus, ramulis valde complanatis necnon sulcatis, appresse pubescentibus; *bracteæ* ovatæ inferiores majusculæ concavei, superiores ad lanceolatæ, v. lineares, subsetaceæ inconspicuæ. *Pedicelli* longiusculi graciles bracteolo minimo basin versus onusti. *Calycis* (cum ovario) campanulati limbus subglabratus obscure lobulato-dentatus nonnunquam apiculatus, subciliolatus, insuper glabrescens, crassiusculus; discus carnosus conspicuus cylindricus. *Corollæ* lobi oblongo-lineares obtusi glabri, tubum gracilem fere æquantes extus glabrum in siccitate nigrescentem, intus in ore necnon faucibus gossypinum. *Staminum* antheræ lineares exsertæ apiculatæ mox torsæ, filamentis brevissimis. *Ovarium* biloculare; *ovula* septi ab apice subpendula; *stylus* tenuis filiformis longissime exsertus, apice indiviso.

Mt. Sogere. No. 454!

One of the several species allied to *P. indica* Linn., but it is distinct especially in its thin obovate glabrous leaves and relatively short corolla-tube. *Leaves* 6–14 cm. × 2·5–5·5 cm., with stalk 1–1·5 cm. long. Terminal *panicle* borne on three primary peduncles, 3–4 cm. long, arising from the uppermost node; at the common base are two boat-shaped *bracts* of stipular nature, ovate, acute, subinvolucrate, 8 mm. × 4 mm. The corymbose cyme at the end of each of these three peduncles is trichotomous, 6 cm. across. *Calyx*-limb of the same depth as the *ovary*—*i. e.*, 1 mm.; *disc* ·3 mm. high. *Corolla*-tube 8 mm. long, lobes 6·5–7 mm. *Anthers* 4·5 mm. long (when twisted). *Style* exserted 1·6 cm. from the corolla-tube.

Morinda leptocalama, sp. nov.

Frutex magnus scandens in fructu tantum omnino glaberrimus, ramis graciliusculis junioribus præsertim tetragonis, nodis plus minus inflatis, lateralibus ample patentibus arcuatim ascendentibus. *Folia* modesta coriacea nitentia elliptica apice modice acuminata acuta basi sæpius subrotundata, brevissime petiolata; venæ primariæ utrinque manifestæ subtus conspicuiores, lateralibus utrinque 5–6; *stipulæ* caducissimæ, vaginam linearem interpetiolarem corticalem relinquentes nonnunquam obscure dentatum. *Capitula* in umbellis numerosa terminalibus disposita, pedunculis gracillimis nonnunquam obsolete minutissime pubescentibus exterioribus arcuatim nutantibus. *Fructuum* capitula tandem aurantiaca, in siccitate dilute fulva, ovariis raro 8–9 excedentibus. *Semina* acute tetrahedra intus alte sulcata testa minute foveolata.

Mt. Gawada, 4000 feet. *Fr.* April. No. 864!

Leaves 7–10 cm. × 3–4·5 cm.; petiole not longer than 5 mm. *Peduncle* up to 3 cm. long. *Heads* barely 1 cm. in depth, and 12 mm. in the broadest diameter. A large climber, with fruits green to orange. Allied to *M. umbellata*, apparently, but distinct in the colouring, especially of the fruiting heads, which are much larger when ripe. The leaves, moreover, are much thicker, and usually conspicuously rounded at the base. *Seeds* 3 mm. wide in broadest part.

NOTES SUPPLEMENTAL TO THE FLORA OF BRISTOL.

By J. W. White, F.L.S.

(Concluded from p. 49.)

Hottonia palustris L. Pond in a field near the Salutation Inn at Henbury, G. No doubt planted.

Cyclamen hederæfolium Ait. By the kindness of the present owner I have been enabled to make a careful examination of the Congresbury locality (*Fl. Brist.* p. 494) and its surroundings. The spot proves not to be a shrubbery in any sense, but is an outlying bit of aboriginal limestone woodland which, although now detached and included in a small private holding, originally formed part of the extensive range of woods that cover the uplands between Brockley, Congresbury, and Wrington. Amongst thick underwood and in company with *Tilia cordata*, *Rubia*, *Lithospermum purpureo-*

cæruleum, *Polygonatum officinale*, etc. the *Cyclamen* occurs in scattered patches, a dozen or more, over a space of at least 100 yards measured from the largest colony situate just within that border of the wood which adjoins the paddock and gardens of the estate. The plant does not look as if it had ever been planted in the positions it occupies; should it be derived from some outside cultivation a very long period would be necessary for it to spread to this extent. I saw no adventive vegetation in the wood beyond a couple of Box-bushes and an Apple, and their age would be infantile compared with that of the plant under discussion. The Cyclamens looked healthy and vigorous and were flowering freely on Sept. 3. The existence of Gerard's note invests this occurrence with extraordinary interest.

Centunculus minimus L. An excellent addition to the local flora. The discovery had been anticipated (*Fl. Brist.* p. 36) but was reserved for the Rev. E. Ellman, who detected a few tiny plants in a mossy track on sandstone "between Pill and Rownham Ferry." *C. minimus* is very rare in Somerset and Wilts, and unknown in Gloucestershire. Its diminutive size (1–1½ inches in this instance) must often enable it to escape observation.

Limonium binervosum C. E. Salmon. Is not lost from the mainland of N. Somerset as was feared (*Fl. Brist.* p. 498). On the Swallow Cliffs near Sand Bay, 1913! *F. Samson.* Rediscovered at Brean Down on the extreme edge of a shelving cliff, 1915! *H. F. Devis.*

Plantago Coronopus L. var. *Sabrinæ* Cardew & Baker fil. A remarkable variation, described in 1910 by Mr. F. N. Williams as *P. serraria* L. Mr. Marshall finds it to be decidedly perennial, and is inclined to believe it specifically distinct. He reports it as occurring very sparingly on Brean Down, and in abundance on Steep Holm, where it seems to have been first gathered by the Rev. T. Butler about 1845 (*Herb. Brit. Mus.*).—var. *transiens* Beguinot. Sandy ground, Berrow, S.; *E. S. Marshall.*—var. *bipinnatifida* Wirtg. Sandy roadside green, Berrow, S.; apparently new for Somerset; *E. S. Marshall* in *Journ. Bot.* 1915, p. 129.

[*Roubieva multifida* Moq. Mule camps at Webbington.]

Chenopodium Vulvaria L. Still at St. Philip's Marsh, 1916; *G. C. Druce.* Luxuriant on a tip at Eastville, 1917; *Miss Roper.* Dustheap at Portishead, 1914! *Mrs. Sandwith.* Shapwick, *Fl. Som. Suppl.*

[*C. leptophyllum* Nutt. A North-American weed. Casual in St. Philip's Marsh, 1910! Still there, 1916; *G. C. Druce.* On a tip near Brislington, and at Portishead, 1914! *Miss Roper.*]

[*Atriplex tatarica* L. Alien. On rubbish near Brislington, 1915! St. Philip's Marsh, 1916; *G. C. Druce.*]

[*A. rosea* L. Alien. A number of large bushy plants on a tip at Brislington, 1915.]

A. laciniata L. (*arenaria* Woods). S. Shore of Sand Bay, Kewstoke, 1915! *Mrs. Sandwith.* Five or six small plants there, 1916. On sand near Berrow, 1915; *Mrs. Sandwith* and *C. Bucknall.* Welcome range-extensions of an extremely rare plant.

Rumex sanguineus L. Two or three plants under a wall at Old-land, G. 1916! *Miss Roper.* Plentiful in an orchard at the Manor House, Chew Magna, S. 1914! *C. E. L. Gardner.* Introduced from Ireland. No new locality had been reported for many years.

R. maximus Schreb. (*R. Hydrolapathum* var. *latifolius* Borrer). Ditchbank, Shirehampton, G. 1914! *Miss Roper.* The plant had the unequal-based, cordate lower leaf, and its fruit showed the broad, denticulated perianth-lobes and broad nut proper to the species (or variety). In the Avon near Saltford Lock, 1917! *C. Bucknall.* This example had been badly used by the flood-water, but the characters were clearly recognizable. Hitherto unreported either in Gloucestershire or Somerset.

[× *R. conspersus* Hartm. (*R. domesticus* × *obtusifolius*). Casual by Portishead Dock, 1908! *Miss Roper.*]

Polygonum minus Huds. Boggy ground at Priddy, Mendip, 1917; *B. W. Tucker.* Is still on the peat at the locality where it was found by the author in 1895.—var. *subcontiguum* Wallich. A small state from the Mineries on Mendip, *B. W. Tucker* (see *Journ. Bot.* 1917, p. 188).

Daphne Mezereum L. Two plants that had not flowered were seen in the wood on Churchill Batch in March 1915, by Mrs. Sandwith. I saw one there in April 1917, still without flowers. Even more satisfactory, perhaps, is the finding of a bush in Eaker Hill Wood, Chewton Mendip, by Mr. B. W. Tucker.

Euphorbia Lathyris L. On made ground at the lower end of Stoke Bishop Wood, G. 1914! *Ivor W. Evans.* Railway bank, Keynsham, S. 1914; *Id.*

[*Ficus Carica* L. *Fig.* Dwarf trees of many years' growth have sprung from a wall of the Floating Harbour near Bristol Bridge, in the centre of the city; from coast rocks near Clevedon; *Rev. E. Ellman*, and from a wharf-wall at Highbridge; *Miss Roper.*]

Urtica dioica L. The Clevedon locality reported by Miss Livett for a plant approaching var. *angustifolia* (*Fl. Brist.* p. 531) is probably that on Stone Edge Batch near Tickenham, where I have lately seen such a variation, well marked and conspicuous.

Ulmus nitens Moench. (*U. suberosa* var. *glabra* Syme; *U. glabra* Miller). Many trees of this handsome Elm stand by Henleaze Lane near the Blind Asylum, making a green arched tunnel of the roadway! *C. Bucknall.* By the road to Rangeworthy skirting Yate Lower Common! *Miss Roper.* The *U. montana* var. *nitida* of Syme in *E. B.* appears to be the hybrid *montana* × *nitens.*

U. campestris Huds. In *Fl. Brist.* p. 533 mention is made of two young Elms at Frampton Cotterell that are curiously united at ten feet from the ground by a horizontal cross-piece. It may be worth while to say here that similar instances of "inosculation" are figured in *The Illustrated London Almanack* for 1847, and in the *Gardeners' Chronicle* for 1849, 421.

Salices with abnormal flowers. A tree of *S. caprea* on the skirt of King's Wood, Rhodyate, S. was noticed by Mrs. Sandwith to bear monstrous ovaries, the germens being borne on stalks as long as themselves and being furnished with pollen-sacs in place of style and stigma. So long ago as 1841 the late Rev. J. E. Leefe described similar metamorphoses of the pistil in *S. caprea*, the changes consisting of a gradual conversion of pistilline into staminal organs. In the *Cambridge Flora* it is stated that androgynous flowers are not uncommon among hybrid willows. The tree at King's Wood, however, is pure *caprea*. On Yate Common Mr. Bucknall has observed several bushes of *S. cinerea* all with the ovaries becoming staminiferous. This is a protean species, and it would be hard to say whether or no the Yate bushes are free from hybridity.

S. repens L. Nailsea Heath! *Miss Roper*. Blackdown, near the summit, in small quantity! *F. Samson*.

[*Quercus Cerris* L. is abundant, with seedlings, in Limeridge Wood near Tickenham, and in the Brockley Woods, S.]

Corylus Avellana L. var. "*contorta*." With all shoots twisted in a spiral fashion. This abnormality, according to Bowles's *My Garden in Spring*, was first found by Lord Ducie in a hedge near Tortworth, G.; and that bush or one derived from it is now, I am told, in the garden of Mr. G. W. Wollaston at Flax Bourton.

Paris quadrifolia L A new station, supplied by Mr. Harold Robbins, in a wood adjoining Beggars' Bush Lane, is now, if the plant be really lost from Leigh Woods, the nearest to the city.

Orchis ericetorum Linton. An addition to the *Flora*. Moors and meadows about Shapwick and Ashcott, S. *Rev. E. S. Marshall* in *Fl. Som. Suppl.*

O. prætermissa Druce. Plentiful on the Clapton side of the Walton valley, 1917. Noticed and determined by C. Bucknall. Max Bog, Winscombe; *Miss Roper*.

Habenaria bifolia R. Br. Wrington Warren, S., ten or twelve plants, 1914! *F. Samson* In two enclosures on the moor near Weston-in-Gordano, S., 1917; *Mrs. Sandwith*.

Epipactis latifolia All. Charlton, S.; *D. Williams*. In the upper drive, Tyntesfield; *Miss Agnes Fry*. Many plants in the wood on Churchill Batch, but none flowering; June 1915.

E. atroviridis W. R. Linton. New to the district and to Somerset. On Lyncombe Hill, Sandford, 1916; *Miss Roper*. Her specimen was approved by the Rev. E. F. Linton.

[*Crocus vernus* Wulf. In a pasture at some little distance from Thornbury Castle, G.; *Mr. Bodman*. Abundant in a large field at Langford, S., to which I was conducted by Miss Roper. It grows rather thickly around a very fine Lime-tree and extends with the outliers 60 or 70 yards, looking quite wild or at any rate of very long standing. Originally it may perhaps have been derived from the gardens of Langford Court, near by, at a time when the pasture was ploughed land.]

Narcissus biflorus Curtis. Five or six clumps in a lowland pasture N.E. of Portbury, S.; *Miss Lucas*. Mr. Waterfall's old record "between Winscombe and Axbridge" was confirmed in 1914 by Mrs. Cyril Walker. The orchard near Pill, Miss Cundall's station, is, I understand, on the Manor Farm, not on Bridgeman's as stated in *Fl. Brist.*

[*N. poeticus* L. Two patches of about a dozen roots each among Yews, Birches, etc. on Brockley Warren, S., far from any building or cultivation, 1917: a plant or two of *N. major* there also. Doubtless the work of some misguided planter.]

Galanthus nivalis L. Abundant in a stretch of woodland and in an adjoining orchard on the hillside above Tickenham, S. The moss-covered remains of ancient masonry suggested that, at a long past period, the neighbouring farmstead had been a holding of greater importance than at present, provided probably with shrubberies and gardens now overgrown and lost.

Polygonatum officinale All. Wood on the east of Rhodyate Hill, S.! In Asham Woods, S. 1917! *Miss Roper*.

[*Asphodelus fistulosus* L. On a tip at Eastville, G. 1916! *Miss Roper*. Still at St. Philip's, Bristol, where I saw it in 1904: *Miss Cobbe*.]

Endymion nutans Dum. var. *bracteata* Hort. G. Combe Dingle, 1912! *Miss Jacques*. Hambrook! *Miss Jarvis*. Bitton! *H. E. Case*. Ivory Hill! *F. Samson*. S. Durbin's Batch, Failand! *Miss Agnes Fry*. Tickenham Woods! 1915.

Juncus maritimus L. The old record for Portishead, unconfirmed since its publication by Mr. S. Freeman in 1841, is now upheld by the Rev. E. Ellman, who has observed several plants of this rush in a salt marsh on the coast.

J. compressus Jacq. Salt marsh, Highbridge. S. 1915! *H. S. Thompson*. And in another spot nearer Burnham, 1916! *Miss Roper*. —A "forma intermedia *J. compressi* et *J. Gerardi*" (Buchenau), =*J. soranthus* Schrank in *Bull. Acad. Peterb.* ii. p. 193 (1843), according to Mr. Bennett, has been gathered on the Channel shore at St. George's Wharf, S. 1916! *Miss Roper*.

J. tenuis Willd. Discovered (Aug. 1914) by Mrs. Sandwith on grassy spots by the Avon under Leigh Woods, extending a considerable distance along the riverside. Subsequently the plant was found to continue up the adjacent valley into the wood and to occur along several paths and tracks on the higher ground. My own opinion is that this must be a comparatively recent introduction, and its possible origin has been indicated in *Proc. Brist. Nat. Soc.* vol. iv. (1915). Those who desire to be informed on the general question of the nativity of *J. tenuis* in Europe can be referred to Buchenau's Monograph of the *Juncaceæ*; Mr. Arthur Bennett's papers in *Journ. Bot.* 1895, p. 39, and *Trans. Bot. Soc. Edin.* 1915; and to Mr. Lloyd Williams in *Journ. Bot.* 1896, p. 201.

Wolffia Michelii Schleid. (*W. arrhiza* Wimm.). The most remarkable addition that has been made of late years to the flora of North Somerset. Discovered by Mrs. Sandwith, June 1915, in a pool on Ashcott Heath. At the end of July it was found in a pond near Brent Knoll Station and in another towards Lympsham by the same lady with Mr. C. Bucknall. A week or two later Mrs. Sandwith got it once more in a rhine between Catcott and Shapwick Station, quite hidden under masses of duckweed. It showed itself by adhering to the botanist's stick. In September it was found again by Miss Roper in a pond and rhine by the railway between Middle Burnham and Edith Mead (*Journ. Bot.* 1915, pp. 311, 339). The fact of this tiny phanerogam being detected within a few weeks in so many stations is extraordinary and raises an interesting question. In several of these localities the plant may have existed from time immemorial and have been simply overlooked. But in one pond at least those who have explored the district with some care are positive that it was not present a few years ago, and that being so, how is the extension of the plant to be accounted for? Miss Roper has ventured the suggestion that movements of waterfowl, wild duck in particular, might enable it to occupy new stations. The suggestion was scouted, but to my mind it is quite reasonable. For it is obvious that if a stick will withdraw from the water a number of adherent organisms no duck could swim in it and depart without carrying them off in quantity upon its feet. Duck are plentiful in our North Somerset lowlands. In 1873 or 1874 Mr. Hewett Watson collected *Wolffia* from a pond near Thames Ditton, where he had botanized for forty years, and no one who knew him could believe that he had so long overlooked it. G. F. Scott Elliot, discussing the range-limits of plant species (*Trans. Nat. Hist. Soc. Glasgow*, 1898) attributes the wide distribution of freshwater plants to the migration of birds. He says, for example, that taking the extremely long range of ducks into consideration, it is conceivable that a freshwater plant might pass right round the globe in four seasons. The supporting evidence of Darwin and other observers might be quoted, but an article by the Rev. E. A. Woodruffe Peacock on "Wild Duck Carriage" in the *Selborne Magazine* of last July should suffice to remove whatever doubt may be entertained on the cogency of this theory. If such a mode of dispersal be operative in the marshlands of North Somerset, we may naturally look forward to a continued spread of *Wolffia* among our outlying ditches and ponds.

Lemna trisulca L. Several fronds in flower of this and of *L. polyrrhiza* were brought from the Glastonbury peat moor by Mrs. Sandwith.

Potamogeton Drucei Fryer. New to Bristol and to Somerset. First gathered in the Avon at Saltford, August 1916, by Mr. Bucknall in company with Mrs. Wedgwood, who afterwards suggested that it agreed with the description of *P. Drucei*. In July 1917 several large patches of the plant were seen between Kelston and Saltford Locks. These had well-developed broad floating leaves, as well as long-petioled lanceolate submerged ones. In August the broad leaves were still more abundant, while the others had nearly disappeared. Mr. Druce, himself, on seeing the 1916 specimens, at once agreed to the name *P. Drucei*; and Mr. Bennett, after examining a complete series, said there could be little doubt they were Druce's plant. In view of the opinions of Fryer and Hagström that *P. Drucei* may be the hybrid *alpinus* × *natans*, it must be noted that the Avon specimens do not show the red colour stated to be present in the Loddon plant, and that *P. alpinus* has not yet been met with in the Avon. Mr. Bucknall could not find any fruit or flower.

P. pusillus L. Detected (1915) by Miss Roper in the artificial lake at Eastville Park, G., supplied with water from the River Frome. This, therefore, may be regarded as a confirmation of Dr. Thwaites's old record in Swete's *Flora* (1854). The station is the only one known in our Gloucestershire division.

P. Friesii Rupr. was lamented as a loss in this district through the recent destruction of the old coal canal that connected Camerton and Midford with the Avon. But fortunately the plant survives in the river, where we were ignorant of its presence until Miss Roper raked out a little (not flowering) in August last.

P. pectinatus L. var. *diffusus* Hagström. Brackish ditch near the Channel at St. George's Wharf, S.; *H. S. Thompson*. Named by Mr. A. Bennett.

Zostera marina L. var. *angustifolia* R. At low water in Kewstoke Bay, S. Oct. 1916; *Mrs. Sandwith* and *Miss Roper*.

Cladium jamaicense Crantz. Nothing more remarkable is written in the *Flora* than the rediscovery of the Great Fen Sedge on Burtle Moor, whence it had been apparently lost for more than a century. That single tussock continues to flower sparingly. A much larger mass is now known to exist on another part of the moors, a locality reported in 1915 by Mr. J. W. Haines of Gloucester. His directions guided me to the spot at a time when the swamp was dry enough for measurements to be made. The main patch was found to be over forty yards long by about five wide, and there were three small outliers at a little distance. Now, assuming that our Western botanists are not more dull or blind than average folk, how can they and their forerunners be excused for overlooking so considerable a growth as this? We seem to get a satisfactory explanation in some remarks by Mr. R. H. Yapp in *The New Phytologist*, 1908, p. 60. He states that in the great fen districts of East Anglia—where it is *the* "sedge"—*Cladium* is cut and harvested for thatching about every four years, it having been found that cutting at shorter periods before the plant again reaches maturity not only leads to invasion by more rapidly growing species, but may even result in local extermination of the sedge. On the peat moors of North Somerset the coarse, rank vegetation of the swamps is habitually mown, when practicable, for use as cattle-food and bedding. So we see that whenever the *Cladium* is cut, should it be but rarely, a long interval happens before it again becomes sufficiently conspicuous to attract attention.

Scirpus pauciflorus Lightf. Bogs in Shipham Bottom, Mendip, 1915! Still plentiful in wet sand at Berrow, 1915! *Mrs. Sandwith.*

S. Holoschœnus L. After years of struggle under the rudest ill-treatment the solitary clump at Berrow has latterly enlarged and has flowered more freely.

Blysmus compressus Panz. Sandy field S.W. of the railway station, Weston-s.-Mare, July 1916; *Lady Davy* and *the Misses Cobbe.* This may confirm an old record by St. Brody in *Fl. Weston.* In his day this sandy field must have been almost if not quite as near to Uphill as to the then existing little town which since has so greatly expanded.

Eriophorum latifolium Hoppe. Is now known to be locally plentiful on the western slope of Blackdown, Mendip. In one bog near the head of Shipham Bottom, first noticed by Miss Roper, it is the only Cotton-grass, whilst in two others it grows with the commoner species.

Carex teretiuscula Good. (*C. diandra* Schrank). At another spot between Shapwick and Edington Droves, at some distance from the original enclosure, 1912! And in still another, nearer Ashcott Station, 1914! *Mrs. Sandwith.*

C. Goodenovii Gay var. *juncella* Fries. A large tussock of this well-marked form on the peat of Shapwick Moor, 1916!

C. pallescens L. Lower Woods, Wickwar, G., 1914; *C. Bucknall.* Reported again from "an open glade" of Leigh Woods by Mr. Noel Sandwith, 1914! Plentiful near Hallatrow, 1917; *R. V. Sherring.*

C. strigosa Huds. Stoke Bishop Wood, 1914! *C. Bucknall.* Markham Bottom near Pill; *H. S. Thompson.*

C. filiformis L. (*C. lasiocarpa* Ehrh.). In 1914, guided by Mr. T. H. Green, I saw this in abundance at Thos. Clark's locality on Glastonbury Moor, and Mr. H. S. Thompson reported it from three enclosures to the westward. For an important discovery by this acute observer of the hybrid × *evoluta* Hartm. = *filiformis* × *riparia*, not previously known in Britain, see *Journ. Bot.* 1915, p. 309.

C. vesicaria L. It is feared that the original station near Iron Acton, G., was destroyed in 1910 by trimming the bank and clearing the channel of the ditch in which it grew. Nothing has been seen of it lately. We always thought it unlikely that this little patch was all that really existed in the Frome Valley, but the river has a tortuous course, often through private policies, and in many places its banks are not open to inspection. In May 1916, Mr. Harold Robbins, whilst fishing, discovered the plant's headquarters in a swamp at some little distance from Iron Acton and on the opposite bank of the stream. The find is of importance, the sedge having no other habitat in West Gloucester and being unknown in the county of Somerset.

[*Panicum sanguinale* L. Abundant (with *P. capillare* L.) on rubbish tipped at Eastville, G. 1916! Brislington, S.; *Miss A. B. Cobbe.*]

[*P. italicum* L. (*Setaria italica* P. B.). Sparingly on the tip at Eastville, G., 1916! St. Philip's Marsh; *Mrs. Sandwith.*]

× *Spartina Townsendi* H. & J. Groves. Introduced on the coast of North Somerset for the purpose of mud-binding and protection of low-lying marshland from inroads of the sea. The results bid fair to prove as extraordinary as those achieved by this grass on the mud-flats of Poole Harbour, where its wonderful progress has been systematically surveyed, photographed, and reported on by Mr. R. V. Sherring. Three or four years ago I was informed by the Rev. E. Ellman that *Spartina* was being planted on the foreshore of the Bristol Channel below Clevedon. The following account of this proceeding and its sequel is based on details obtained from the local Wharf Warden by Mr. F. Samson and from his own observations on the spot. At that part of the Channel shore the scouring effect of the tides on the existing mud-flats had been such that whereas

20 years ago six feet of alluvial mud covered the clay and peat below, by 1917 only six inches of mud remained, and it had been necessary to repeatedly underpin the outer sea-banks thus left unsupported. In 1913, a thousand small tufts of *Spartina* were brought from Poole and planted a yard apart on the inner margin of the mud in a line beginning at the mouth of the river Yeo and stretching about 1⅛ miles to the N.N.E. along the shore. During the past four years these tufts have grown vigorously, so that many of them are now a yard in diameter. Sand has collected, covering the mud among the stems and making it possible to stand firmly on a clump. In all it is computed that at present there are 2000 tufts besides a multitude of tiny ones springing either from seed or from long stolons. Another remarkable fact is that although planted close to the land the grass appears to have shifted its position seaward, and now occupies a line 50–100 yards farther out. This movement corresponds with the action of the plant on the Dorset coast. By fixing mud and silt it consolidates and raises the level of the ground it grows on, in time rendering it habitable for other saltmarsh vegetation, whilst the *Spartina* pursues its invasion of the outlying mud. In Somerset this process has not yet continued long enough for us to know how efficient it will prove. The waters of the Bristol Channel are less calm than those of a land-locked harbour. On occasion its waves show tremendous power. But if they can be withstood successfully by the tenacious growth which is being put forth to meet them, the result must be of inestimable value to the landowners concerned.

Calamagrostis epigeios Roth. Highwood Lane, Charlton, G.; *F. Samson.* In plenty along a hedgerow south of the Battleaxes Inn, Wraxall, S. Bank between the Battery point and the lake at Portishead; and a short distance along the coast-path towards Clevedon; *Rev. E. Ellman.* Mr. Thos. Clark's record for the turf-moor near Shapwick Station seems not to have been repeated until Aug. 2, 1913, when I found the plant extending a few yards in a rushy swamp within half a mile of the Station. A few weeks later the Rev. E. S. Marshall came upon it in two very limited locations on the peat. Then, in 1915, Mr. H. S. Thompson found it plentifully north of the railway on a bank of the old canal. His gathering in habit somewhat resembled *C. lanceolata*, the panicle being quite loose and open. About the same time Mrs. Sandwith reported a small patch not far from Ashcott Station. With these additions the grass has now so many localities in the district that it might well be transferred from the "rather rare" to the "frequent" section of our plants.

[*Polypogon monspeliensis* Desf. Still on the rubbish of St. Philip's Marsh, 1916; *Misses Cobbe.* A good patch in a little orchard near Failand House, 1914! *Miss Agnes Fry.* A fair quantity near Berrow Church, 1913; *T. H. Green.*]

Kœleria vallesiana Asch. & Graebn. Purn Hill, Bleadon, S. 1915; *H. S. Thompson.*

Festuca arundinacea Schreb. A first record for North Somerset was obtained by Miss Agnes Fry, who sent a specimen from the cliff path near Ladye Bay, Clevedon, 1915.

Bromus interruptus Druce. Colonist; in cultivated ground.

New to the district. Plentiful in a field of sown fodder on the Tyntesfield estate near Wraxall, June 1913. A few plants still on the border of the field, 1915. Mr. Bucknall and I could find the split palea only in florets with immature or abortive fruit.

[*Hordeum jubatum* L. A North-American species, not naturalised. St. Philip's Marsh, G. 1914! *Mrs. Sandwith.* And 1915; *G. C. Druce.* On a tip near Brislington, S. 1914! *Miss Roper.*]

Lolium temulentum L. On a tip by the Frome at Eastville, G.! Plentiful on a corn-sifting plot to the south of St. Philip's, 1916! The awnless form (*arvense* With.) is doubly starred in Druce's list of St. Philip's Marsh aliens, but was recorded thence in *Fl. Brist.*

Lastrea spinulosa Presl. Fry's Bottom, Chelwood, S.! *Miss Roper.* Max Bog, Winscombe; *Id.* Asham Woods; *R. V. Sherring.*

L. dilatata Presl. On a large plant of this fern in Glen Frome, G., the growth of every frond had been arrested half way by the attack of a dipterous insect (*Anthomyia signata* Brischke); the upper half of the frond was condensed into a solid mass containing the grub. Although all the fronds of this plant were affected, not one of those growing alongside had been touched. I hear from Miss Roper that she noticed this malformation at the same spot seven years earlier.

Asplenium lanceolatum Huds. My trust that this might still exist in some other parts of Glen Frome (*Fl. Brist.* p. 685) has been justified. In June 1914, Mr. W. H. Pullin showed me two spots on precipitous sandstone rock above the river, in one of which there grew at least twenty plants. In 1916 he discovered another, in a still more inaccessible place, where the fern is even finer.

Ceterach officinarum Willd. Bifid or trifid fronds, so frequent on plants of *Scolopendrium*, are in my experience extremely rare with this fern. Miss Lee, of Bristol University, has lately found both variations on a wall at Kelston, S. My statement in *Fl. Brist.* that *Ceterach* is unknown in Middlesex was based on *Fl. Midd.* 341. I learn from Mr. C. B. Green, of Swanage, that during his residence in Middlesex he became aware of at least four stations for the fern in that county, in one of which it was fairly plentiful.—var. *crenatum* Milde. Sandy Lane, Abbotsleigh; *Miss Lee.* Old walls at Blagdon, Mendip, the upper at 720′; *H. S. Thompson.*

Equisetum palustre L. var. *polystachium* Vill. The Mineries on Mendip; and Congresbury Moor; *Miss Roper.*

Lycopodium Selago L. Three or four plants were discovered on Blackdown, Mendip, at the end of March 1915 by Mrs. Sandwith. I saw three in May. The next year about twenty were found on another part of the warren by Miss Roper. Some of these had been badly scorched by a heath-fire.

Nitella opaca Ag. In an old strontia pit S.W. of Yate Court, G. June 1917; *Mrs. Sandwith.*

N. mucronata Miquel. The species is rare in Britain and unknown in the Western counties. In a pond (one of a series of old strontia pits) S. of Hall End near Wickwar, April 1917, G.! *Miss Roper.* Found in good quantity and fruiting well. The careful examination of a series of gatherings by Canon Bullock Webster and Mr. James Groves has led to Miss Roper's plant being described as a distinct variety—var. *gracillima*: see *Journ. Bot.* 1917, 323.

N. intricata Braun. (Leonh.). New to the Bristol flora. Discovered, May 1917, by Mrs. Sandwith in a small muddy pool (a strontia pit) N. of Yate Church, G.!

Chara fragilis Desv. A first record for the typical plant in the West Glouc. division of the district. In a pond (once more a strontia pit) on the skirt of Yate Lower Common, June 1917! These ponds or pits in the vicinity of Yate—there are several hundreds of them—from which so many good aquatics have been taken, are small excavations in the grits and sandstones of the locality, made in extracting the strontium ore that occurs in pockets near the surface, a process still going on. Although often only a few feet in area, they are seldom filled up when done with; water collects at once on the impervious rock and vegetation quickly follows. As the ponds are artificial the plants must be introductions, so here again we see the work of wild-fowl, and interesting work remains for us in a search for the original habitats or headquarters from whence the aquatics have been brought. Such sources may lie at a considerable distance, perhaps far beyond our limits.

Aliens. Our unsavoury heaps of city refuse with the neighbouring grain-sifting plots and fowl-runs continue to yield varied crops of foreign weeds. In general I have put on record such casuals as have occurred with some regularity on the same ground, or in more than one locality in the district. Others, seen once only, as a rule have been ignored. These immigrants, it may be noted, have an especial charm for some botanists, and their collection has been lately stimulated by the news that a descriptive Alien Flora of Great Britain is in preparation. A bevy of helpers in the work, from far and near, has visited the Corporation tips of St. Philip's and St. Anne's, in particular; and a lengthy list of their observations has been inserted by Mr. G. C. Druce in his *Rep. Bot. Soc. & B. E. C. B. Isles* for the last two years. Truly we have travelled a long way since Hewett Watson penned his caustic comment (*Comp. Cyb. Brit.* 466) on the topographical value of a tomato on a dunghill!

SIR GEORGE BIRDWOOD AND "PRIMROSE DAY."

By the death of Sir George Christopher Molesworth Birdwood at his residence at Ealing, on the 28th of June last, *The Times*—which on the day following had an interesting memoir of him—has been deprived of a correspondent who has occupied that position for about forty years, and who during that time placed at the disposal of that paper and its readers his vast store of information. "Among Anglo-Indians," says *The Times*, "Sir George Birdwood had long occupied a unique place, even apart from his position as an authority on all matters pertaining to Indian art, mythology, literature, and history, on account of his intense sympathy with the people of India and a personal influence over them. Both at Bombay and at the India Office he originated many developments in the economic resources of

India, which, though identified with other names, but for him would never have attained success. He was one of the makers of New Bombay, and he left an imperishable impress on the city, where his birthday was annually observed with rejoicing and his bust in the University Senate Hall regarded as a shrine."

Born at Belgaum, Bombay, on December 8, 1832, George Birdwood, at the age of seven, came to England with his father, General Christopher Birdwood, and was placed at school: in due course he went to Edinburgh University, where he graduated M.D. in 1854. Here he became class assistant to John Hutton Balfour:

"It is no doubt due in large measure to my training under Professor Balfour" he informed an interviewer for the *Morning Post* (Dec. 11, 1911) "that botany has always been a favourite study of mine. More particularly I have interested myself in commercial vegetable products of Biblical and classical interest. The researches of scholars have been so extensive that there is little now that is not known with regard to the different kinds of flora mentioned in the Bible. I was, however, so fortunate as to identify for the first time the frankincense plant. For many centuries incense had been in use in Christian churches, yet, botanically speaking, it was unknown. It was collected by wild tribes somewhere in Arabia or Somaliland and despatched to Europe by exporters. Fortunately I had a friend in the late Lord Playfair's brother, who was British Resident at Aden, and I told him where I thought the plant might be found. He sent men out into South Arabia and the Somali country, and eventually he brought me specimens which proved beyond question to be what I had been seeking. My paper describing the plant was in the form of a lecture at the Linnæan Society, and it was published in that Society's Transactions."

This paper (Trans. Linn. Soc. xxvii. 111–148: 1870), in which three new species of *Boswellia* are described, is an excellent piece of work, containing as it does a history of olibanum or frankincense from the earliest period down to the time of writing with references to the literature of the subject. The position of the Arabian thuriferous region had already been fixed by Henry John Carter (1813–95), of the Bombay Medical Service, who had published a paper on "the Frankincense tree of Arabia" (Journ. Bombay R. Asiat. Soc. ii. 380: 1847) which he identified with *B. thurifera*, but which Birdwood described as new, naming it after him *B. Carterii*. This paper was reprinted as an appendix to M. C. Cooke's *Report on the Gums, etc. of the India Museum* (1874): another paper on the same subject was contributed to the *Pharmaceutical Journal* for 1871.

In 1854 Birdwood was appointed to the Bombay Medical Staff; here he filled the offices of Secretary and Curator of the Government Central Museum, Professor of Materia Medica at Grant's College, and Secretary to the Agricultural and Horticultural Society of Western India. In connection with the Museum he published (1862) a *Catalogue of the Economic Products* of the Presidency—a full and careful compilation from the best authorities, with notes exhibiting considerable knowledge and research into the early history of some of the plants enumerated. Such knowledge characterized all his communications, especially those relating to India: of these a selection was brought together in a volume entitled *Sva* (Myself), published by the Oxford University Press in 1905.

On his return to England, Birdwood took up work at the India Office, where he remained from 1871 until his retirement in 1902. Shortly after this he went to live at Ealing, where he added gardening to his other interests. Plant-associations had always a keen attraction for him: he was greatly interested in plant-names, which his knowledge of languages enabled him to study in various tongues; his acquaintance with these in the Indian languages bore fruit in the appendix on the Aryan flora and fauna which he contributed to Max Müller's *Biography of Words* and which is included in the volume of essays already mentioned. I had some correspondence with him about our English names, in the course of which he wrote—"Your invaluable *Dictionary of English Plant Names* is one of the works, amounting to over 500 vols., I have always kept within arm's reach of my bed .... I think I know your Dictionary pretty well by heart."

At the time of the *Morning Post* article, the question of the originator of "Primrose Day" was in discussion, and the interview contains a paragraph relating to this. As I was writing to Birdwood, I asked him one or two questions in connection with the matter, to which he replied with his accustomed fulness. The subject is not one of botanical interest, but as time goes on the history of the celebration will probably pass into folk-lore, and it may be worth while to put on record this authentic information from its originator:—

"When I wrote my first letter in *The Times* signed 'Far from the madding crowd,' in saying 'We all know the authority for the fact of Lord Beaconsfield's fondness for Primroses,' 'of its being his favourite flower' I had in my mind the inscription on Queen Victoria's card attached to the wreath of Primroses H.M. of ever revered and beloved memory, sent to be placed on his grave at Hughenden. Since then I have heard that by 'his' in her Majesty's inscription the reference was not to Lord B., but to the Prince Consort. But only some months ago I was told by a gentleman who like you referred to me on the question that he had made searching enquiry elsewhere, and had come to the conclusion that it really was Lord Beaconsfield who was meant: and my interviewer for the *Morning Post*—Moy Thomas, the son, not the father—also insisted on this, scouting the doubt on the subject I felt bound to mention to him.

"My first letter in *The Times* was published just before the first anniversary of his death [1881], and at the same time I advertised in all the leading London papers that on the approaching anniversary all the florists of the West End, London, would be prepared to provide Primrose bouquets as button-holes to wear on that day. I think I phrased them 'Beaconsfield Button-holes.' The next year I again advertised all round, and again wrote a letter in *The Times*, this one signed 'Hortus Siccus.' I wrote no more, but think I advertised a third year—for even from the first year absolute success was achieved. It was in this second year's letter and advertisements that for the first time I used the phrase 'Primrose Day.' Knowing that all sorts of people would claim a hand in the deed, I precautiously did all the advertisements through Messrs. Henry S. King & Co. of Cornhill, bankers and India agents.

"Some four, five, or six years ago, the Primrose League made me a Grand Cross of the League for my services in this connection; although I never was a member of the League, and when Lady Borthwick wrote and asked me to join it, before it was founded, as a Founder, I flatly refused.

"Now the here and there vagueness of this statement is due to the fact that Mr. Moneypenny, the biographer of Lord Beaconsfield, on the publication of his first volume, expressed the desire to see me on the subject of the foundation of Primrose Day, as he said that all sorts of people were claiming the honour of it, and so far as he could discover without any proof of their claims. I met him, and simply showed him Messrs. King & Co.'s bills, and my letter to *The Times*, and the League history of the origin of the celebration of the Day; and he at once without any more words swept the whole deck of false claimants to the honour . . . ."

It may be noted, as closing the history of the matter, that at the time the subject was under discussion, Canon Blagden wrote a letter which was published in the *Westminster Gazette*: I omitted to note the date of publication, but the letter is dated April 30 :—

"I was vicar of Hughenden when Lord Beaconsfield died, and I beg to say that a large wreath of primroses was sent to us, bearing this inscription (which was written by her Majesty's own hand): "His favourite flowers, from Osborne." The wreath was placed on the railings with several others, and though unfortunately the inscription was taken away by one of the thousands of visitors, the primroses are now in our possession. I have further to say that during the many years of her survival of Lord Beaconsfield her Majesty never failed to send a wreath of primroses to Hughenden, which was placed on his grave by her Majesty's command."

James Britten.

SHORT NOTES.

Hieracium hyparcticum Almqvist in Norway. Among a few Hawkweeds from Myrdal, &c., sent to me for naming by Mr. H. W. Monckton and collected by him in 1913, there is a sheet of this very rare and peculiar species. It agrees in all essential points with my no. 4306, gathered (1916) by the Allt Coire Duibhe, Glen Shirra, Laggan, v.c. 96, E. Inverness; also with the Inchnadamph (W. Sutherland) plants of 1890, so named for Mr. F. J. Hanbury by Dr. Elfstrand, as a *forma*. It appears to be new for the Scandinavian peninsula, and was described from S. Greenland material; so this occurrence is of particular geographical interest. I may add that two sheets of *H.* '*alpinum*' (from Myrdal and Finse) are excellent *H. gracilentum* Backh. In his *Monograph of the British Hieracia* (1856), p. 26, Backhouse states that specimens from Norway, sent to him by Blytt as typical forms of the plant figured as *H. alpinum* in the *Flora Danica*, tab. 27, correspond almost exactly with his own specimens of *H. gracilentum* from Lochnagar and Canlochen Glen. I have examined this plate, which undoubtedly represents a form of *H. gracilentum* with unusually entire foliage.—Edward S. Marshall.

Ulex Gallii Planchon in Kent. We excluded this species from the *Flora of Kent* (1899), although F. M. Webb reported it in 1874 from Hothfield Heath, where Mr. F. J. Hanbury and I could only find *U. minor* Roth (*nanus* Forster). Fleet-Surgeon C. G. Matthew, R.N., has sent me specimens of excellent *U. Gallii* from the edge of a copse on a hill-side near St. Radigund's Abbey, not far from Dover, v.c. 15. I have seen strong forms of *U. minor* in Surrey closely resembling *U. Gallii* in appearance, but with paler flowers, and differing in the floral characters.—Edward S. Marshall.

Arabis petræa Lam., var. grandifolia Druce. This well-marked variety has (as Mr. Druce maintains) been wrongly identified with var. *ambigua* Fries, *Mantissa*, iii. p. 77 (1842) = *A. ambigua* DC., *Systema*, ii. p. 231. This is, according to DC., *Prodromus*, i. pp. 145–6, a *biennial*; and neither his nor Fries's descriptions agree at all well with the Ben Laoigh plant. *A. ambigua* appears to be a distinct species, submaritime, occurring in Siberia, Kamtschatka, Unalaska, and Norway.—Edward S. Marshall.

Status of Allium triquetrum in Britain. Readers of Mr. Marshall's note may be interested in a leading article entitled "A New Vegetable and its Origin," in Gard. Chron. Nov. 8, 1913, and correspondence in the following number by Messrs. George Henslow, Reginald Farrer, and myself. I pointed out that *A. triquetrum*, common on the coast of Algeria, usually grows in southern Europe in natural conditions approaching those in which it is now being cultivated as a vegetable in N. Africa; that in the S. of France moist, shady places and borders of streams well describe the habitat; and in Guernsey it is not infrequent in hedges; and that Mr. Lester-Garland calls it in Jersey "a naturalised alien and spreading." These habitats correspond with those in Davey's *Flora of Cornwall*, but in the Mediterranean region it usually grows within a few miles of the sea coast; whereas in Cornwall some of its stations are well inland. If this plant grows as a native inland in Cornwall we should expect it to grow still further from the hot coasts of the Riviera, notwithstanding the temperate sea-breezes, but I believe this is not so. Can it be that the plant is naturalized also on the Côte d'Azur, in common with many others? I still have no decided views on the question of its status in Cornwall; doubtless Dr. Stapf had good reason in 1917 for considering it an alien, whereas in his paper on the "Southern Element in the British Flora" (Bot. Jahrb. 1914) he was doubtful. I have a photograph of *A. triquetrum* growing with *Sium angustifolium* and *Apium nodiflorum* in a shaded ditch close to Hyères; and it is interesting to point out that Dr. Stapf says: "The Atlantic element is very prominent among the most widely diffused of the southern species, and its prominence appears still more marked if we take into consideration that the general presence of the Mediterranean *Apium nodiflorum* and *Carduus pycnocephalus* is probably due to their great faculties for extending their area—the former as an aquatic, the latter as a waste-land plant (Proc. Linn. Soc. 1917, p. 88). If, as Mr. Marshall and others suggest, this plant is a true member of our Lusitanian group, its distribution and status in Portugal and

Spain, about which I should like enlightenment, would of course be the determining factor in regard to its possible nativity in Cornwall and the Channel Isles.—H. S. Thompson.

I think *Allium triquetrum* should be considered indigenous at the Lizard; I have found it by a stream between Kuggar and Ruan Minor, where it seems unlikely to be an escape; I have seen it in gardens at Cadgwith and Mullion, but suggest that it may have been introduced from the wild locality.—Harold A. Britten.

Cynosurus echinatus in Kent. In June 1916 my friend Mr. C. J. Alexander sent me from Dover some specimens of this grass, which he reported as occurring in "a considerable patch on the cliff above the railway line between the Town Station and the Shakespeare's Cliff tunnel." This may be worth recording in view of the old entry in G. E. Smith's Cat. pl. South Kent, 7 (1829)—"Said to have been found near Dover," an entry which brought forth the remark in Hanbury & Marshall's Fl. Kent, 400 (1899)—"Probably due to an error."—C. E. Salmon.

[Surely in each case the plant was a casual, hardly worthy of the attention it has received.—Ed.]

Viola rupestris Schmidt, var. glabrescens Neuman. Violets gathered in 1915 and 1917, in two spots near Chepstow, but in v.c. 34 (West Gloucester) and in 1917 on the Cotteswolds in v.c. 33 (East G.) were pronounced by Mrs. Gregory to be, not a form of *V. Riviniana* Reichb., but the above-named variety, to which Mrs. Gregory refers in her *British Violets*. Any uncertainty which she felt at first is now definitely removed by the sight of the 1917 specimens: her note on the specimens says "I have come to the conclusion that true *V. rupestris* with its vars. and forms can be best distinguished from *V. Riviniana* with its vars. and forms by its broader, shorter and more sparsely fringed stipules, which are often almost entire." Mrs. Gregory tells me that she has also seen specimens gathered in the Clova Hills. *V. rupestris* var. *glabrescens* also occurs as f. *alba* (white flowered form) in v.c. 34: and I have found hybrids (and other intermediates) between it and *V. Riviniana* in v.c. 34. Some account of the discovery is given in my "Report (No. 6) on the progress made in connection with the Flora in Gloucestershire" (*Proc. Cotteswold Nat. Field Club*, xix. 101: 1917.—H. J. Riddelsdell.

REVIEW.

Plant Succession: an Analysis of the Development of Vegetation. By Frederic E. Clements. Carnegie Institute of Washington, Publication No. 242. Pp. i–xiii, 1–512.

In the preface to this excellent work the author tells us that it "constitutes the general part of a monograph on Rocky Mountain vegetation . . . The general principles advanced here are an outgrowth of the treatment," he says, in his *Development and Structure of Vegetation* (1904) and *Research Methods in Ecology* (1905), in which an endeavour to organize the whole field of present-day succession was made for the first time. The volume before us may not be calculated to enhance our previous sufficiently good opinion of Professor Clements as an ecologist; but it proclaims him in the first rank as a writer of text-books. For this is more than the "general part of a monograph"; it is a text-book of Ecology, treated as all biological text-books should be, but too seldom are, treated, from the historic standpoint and from the aspect of general evolution.

The work opens with the conception of the unit or climax formation as an organic entity, and, like all organisms, ever changing, never fixed; and the principle that every formation has its phylogeny as well as its ontogeny is kept throughout in constant view. A striking feature of the book is its wide range, not only of subject, but also of concrete example. This is a natural result of the historic treatment; so the author is preserved, in spite of his nationality and the scene of his strenuous practical labours in the field, from laying undue stress upon his native continent; no more space is accorded to the vegetation of North America than is demanded by its vast size and importance. This remark, however, unfortunately, does not apply to the illustrations; for the large majority of these are of vegetation-groups in the United States. These, however, have the advantage, presumably, of the author's personal and able choice, many of them being reproduced from original photographs. Besides 51 figures in the text, many of them diagrams, maps, and phylogenetic schemes, there are 61 plates. Of these, 59 are full-page reproductions from photographs, each page containing two pictures (three in one or two cases), about $4\frac{1}{2}'' \times 4''$ or $4\frac{1}{2}'' \times 3\frac{1}{2}''$. They are excellent beyond all praise, especially considering the small space available, and are admirably chosen to illustrate general principles—a small photograph cannot be hoped to do more. Seven of the pictures are taken from British scenes; one from Denmark; the remainder, one hundred and eighteen in all, are from North and Central America. In consulting these, the British student will labour, in most cases, under the disadvantage of being unfamiliar with many of the plants in question, even the dominant ones. He may even be driven to a herbarium!

The work is arranged in fifteen chapters, and a glance through the titles of these will suffice to exhibit the thoroughness with which the author has treated his subject—a thoroughness which has not led, as it does in many cases, to prolixity and obscureness. The book is written in a refreshing style, and is, from the point of view of the earnest student, almost dangerously readable. The whole is divided clearly into titled paragraphs, and their titles appear, under their respective chapters, in the table of contents at the beginning, which is thus a sort of *précis* of the whole—an admirable arrangement, not common enough, even in the most modern books. An introductory chapter defining basal principles and fundamental terms deals with the "Concept and Causes of Succession." Some of our European students may be alarmed to hear a unit succession called a *sere*; and, having recovered from this alarm, he will be menaced further with *cosere*, *prisere*, *hydrosere*, *subsere*, not to mention *eosere*, *ceneosere*, *geosere*, *palaeosere*, etc. Professor Clements claims for the word that it is "significant, short, euphonic (*sic*), and easy of combination"; and has the further advantage of both Greek and Latin parentage—an advantage that it shares with the ordinary word *series*. We are inclined to agree with these contentions—at any rate, the author leaves no term without an adequate and clear explanation. The second chapter comprises a most useful "General Historical Summary," condensed into twenty-two pages, from King's work in 1685 on the bogs and loughs of Ireland, to that of MacDougal and others, as late as 1914. This summary, one feels, lies in the background throughout the remainder of the book; conformably with the wide range of the author's treatment of his subject, he is generous in his attention to the work of every labourer in the ecological field, and the mark that he has left upon the record of ecological research. In this connection, the Professor lays well-merited stress upon the work of Dr. C. E. Moss, without which more than one chapter in the modern science of Ecology would remain unwritten. The third chapter, "Initial Causes," gives a physiographical account of the formation of bare areas; the ground is cleared, so to speak, of all plants, to make a fair start. The titles of the next two chapters, IV. "Ecesic Causes" and V. "Reactions," tempt us to suspect Professor Clements of a weakness for new words. *Sere* and its relations we learn to forgive, if not to love, for necessity's sake; but the titles of the chapters in question excite our wonder as to what they are about—a poor recommendation for a title. "Ecesis," we learn, is derived from *οἶκος*, a house, and means "the adjustment of the plant to a new home"—a meaning that would have served admirably as the title of Chapter IV.; just as "the effect of the plant or community upon its habitat"—the meaning of "Reaction" in the present connection—would have been an excellent title for Chapter V. These two chapters cover a large field—including migration of plants, competition, invasion, etc., on the one hand, and soil-formation and structure, soil-organisms, the light-, air-, water-factors, etc., on the other. The matter, however, is so judiciously condensed that the space occupied is in no sense out of balance with the rest of the work. We venture at this point to urge that the author has made too little use in the text—especially in this part—of the bibliography with which he is evidently extensively familiar, and of which he gives us a fair, but by no means exhaustive, sample in a catalogue of twenty-five pages at the end.

A sixth chapter brings us to the last stage—"Stabilization and Climax"—in the history of the formation; and, at page 111, we enter, with Chapter VII., upon the "Structure and Units of Vegetation." This is an admirable *résumé* of the various concepts of standard authorities—Grisebach, Drude, Moss, Schröter, Gradmann, and Warming,—and is in the best historical manner of Moss in the *New Phytologist* (ix. 18; 1910), whom he quotes constantly and at considerable length. Chapter VIII., on "Direction of Development," introduces us to the finished article; Chapter IX. deals with the "Classification of Seres." This is largely original, the author being himself responsible for the first system of classification, in his *Development and Structure of Vegetation*. Chapter X. begins the concrete examples of formations—"Climax Formations in North America." Although his own work in this field must be very extensive, the writer makes but little allusion thereto; but we recognize the advantage of his experience in making a suitable selection from the vast body of material that must have passed under his purview; for he has not much more than fifty pages at his disposal for this important section of his subject. Chapter XI., "Succession in Eurasia," disposes of this section in a further forty pages,—a *résumé* of the chief work recorded upon the vegetation of Scandinavia, Britain, Middle Europe, Russia, Mediterranean region, and the Tropics. Britain can claim but a dozen pages in this really well-balanced text-book of Ecology. The next three chapters, XII. to XIV., deal with the past history of the world from the phytogeographical standpoint, and constitute a welcome new departure in the treatment of the history of formations. The author displays his originality by the very presence of these pages, which deal with considerations too often lost sight of in this branch of study—considerations lying at the very root of the matter. By the way, we would suggest that if the Professor feels bound to economize by the spelling *cenophytic* for the more familiar *cainophytic*, he might omit the second *e* in *ceneosere, meseosere*. The last chapter is a succinct account of practical methods in ecological research, of which the writer has already revealed himself as no dilettante, in his *Research Methods in Ecology*. The remainder of the book is occupied with Tables of Genera, Life Forms and Dominants, Bibliography, and, last—in this case least, for it represents the one serious omission in the work,—an imperfect Index, containing the names of plants and communities only. We are in direct disagreement with the author's remark at its head—"The full table of contents and the selection of running heads appear to make it undesirable (*sic*) to index subjects."

Like all good text-book writers, Professor Clements reveals himself here as a conscientious and able compiler. The compiler's is largely a thankless task, for he labours under the suspicion not only of the absence of originality, but of the lack of even the possibility of it. The book before us affords a clear proof to the contrary. Although but little of the author's own research is described in these pages, this is due as much to his sense of proportion as to his modesty. We have said enough to reveal him as possessed of a rare gift for arrangement of his intricate subject, as well as of a happy and original knack of expressing clearly and readably the work of others, blending the heterogeneous mass of research-work into an organic whole. This is the gift not only of original talent, but of genius.

H. F. WERNHAM.

BOOK-NOTES, NEWS, ETC.

AT the meeting of the Linnean Society on February 7th, Dr. Daydon Jackson gave an account of the *Panphyton Siculum* of Francesco Cupani (1657–1710) which was described by Pritzel as "liber ineditus rarissimus." A few copies, none of which were complete, were issued in 1713 by Cupani's patron, the Prince Della Cattolica; the copy in the library of the Jesuit Fathers at Palermo is the nearest complete and is therefore cited by Gussone in his *Prodromus* and *Synopsis*; it consists of three volumes with about 700 plates, without text; the copy in our library has only 196 plates, two of which are in duplicate. This was followed by a reissue, in the year 1722 or thereabout, of 168 plates with engraved numbers and names of the plants altered in some cases, but without title or text. Pritzel enumerates 6 copies he has seen, and additional copies in the same state exist in our own library, the Banksian collection in the British Museum, and the Botanical Department of the Natural History Museum; the last-named copy wants 29 plates. In 1807, Rafinesque, then living at Palermo, issued a prospectus of yet another issue as *Pamphysia Sicula*, which is cited by Gussone, but apparently no copy is known in this country. The single plate in this prospectus is from an engraved plate, whereas the two earlier issues are from etched plates. A second volume shown by Dr. Jackson was the anonymous *L'Histoire et Pourtrait des Plantes*, Lyon, 1561. The volume belonged to Linnæus; a pencil note on the titlepage by Smith refers to an entry in Haller's *Bibliotheca Botanica*, i. 318, which proves to be copied from Adanson's *Familles des Plantes*, i. p. 6, where the book is described from Jussieu's library. Jussieu's copy is given as published at Rouen in 1555, and attributed to Du Gort; the brothers Jean and Robert Du Gort were printers at Rouen at that time, and probably drew up the volume from the Lyons issue of Fuchs's *Historia Stirpium* of 1551, as 19 of the cuts are identical in both books. At present no help in clearing up the points involved has been obtained from Barbier's *Ouvrages Anonymes*, Quérard's *La France Littéraire*, nor has any copy been found in any bibliography or library answering to that shown, which seems to be unique.

The *Transactions of the Perthshire Society of Natural Science* (vol. vi. part 4) contains some discursive "Botanical Notes," by Mr. D. A. Haggart, and a summary of the work of the Society during the fifty years of its existence by Mr. W. Barclay.

At the meeting of the Royal Society on Jan. 31 Mr. A. Mallock read a paper on "The Growth of Trees," in which an account was given of some recent observations. These consisted in the measurement, at short intervals of time, of the variation of the girth of the trees at a height of four or five feet above the ground; the measures were made by an "interference" method which is described. The results showed a well-marked daily period in the variation of girth, different for different species of tree, but in all cases having a maximum at night and a minimum shortly after noon. Diagrams of sets of observations, each extending over several days, are included, showing the growth of a black poplar, an oak and a Douglas fir. From twenty to thirty readings were taken in the course of each twenty-four hours.

Our readers, and especially those through whose kindness the serious deficit upon the volume for 1916 was met, will we think be glad to know that the account for 1917 shows a comparatively small loss, which indeed is more than met by the balance that remained after the 1916 bill had been paid. This result is due to certain economies which we were compelled to adopt, and also to an increase —not large, but sufficient to affect the result—in the number of subscribers: we need hardly say that we should be grateful for further additions to the list. There has also been a gratifying absence of the difficulties connected with production which during 1916 tried the patience of Editor and subscribers alike.

CREPIS NUDICAULIS L. AND LEONTODON HIRTUS L.

By C. C. Lacaita, F.L.S.

In the following paper I shall attempt to prove:

I. That *Crepis nudicaulis* L. is either *Leontodon Villarsii* Lois., in which case the name must be altered to *Leontodon nudicaulis*, or a *nomen confusum* to be discarded.

II. That *Leontodon hirtus* L. is *L. Villarsii* and not *Thrincia hirta* Roth, introducing evidence from the Linnean Herbarium that has hitherto been overlooked.

III. That the legitimate title for *Thrincia hirta* Roth is *Thrincia taraxacoides* (Vill. sub *Hyoseride*).

1. Crepis nudicaulis L. Sp. Pl. p. 805 (1753), "foliis lanceolatis, dentato-sinuatis, hispidis, setis subulatis, scapo unifloro," is certainly not *Thrincia hirta* Roth, but either *Leontodon Villarsii* Lois. or a mixture of that species with *L. crispus* Vill. The Bauhin synonyms cited belong to *L. crispus* or to the almost identical *L. saxatilis* Rchb. The words "fol. lanc. dentato-sinuatis" are more suitable to *crispus* than to *Villarsii*, but the expression "setis subulatis" admirably indicates a peculiarity of *Villarsii* and is inapplicable to any other species that could be intended. The habitat, "Gallia Narbonensis et Hispania," suits both *crispus* and *Villarsii*, but hardly would allow of *Thrincia hirta*. The setæ on the leaf of *L. crispus* are slender, but very conspicuously three-forked at the top, as can easily be seen by the naked eye. Those of *Thrincia hirta* are much less copious, short, and for the most part obviously forked—"bifides en y-grec," in Villars's words. Those of *Villarsii* were described by Ball in Ann. Nat. Hist. vi. (1850) as "longis albis simplicibus, interdum apice brevissime furcatis." They are very thick at the base, altogether longer and stronger than in *crispus* or in *T. hirta*, but to the naked eye they look simple (*cf.* Vill. Dauph. iii. tab. xxv.), though a good lens reveals that many are very shortly two- or occasionally even three-pronged at the tip.

In Sp. Pl. ed. 2, p. 1134, Linnæus quotes his previous diagnosis of *Crepis nudicaulis*, without mentioning that name, as a synonym of *Leontodon hirtus*, which, as will be shown hereafter, is unquestionably identical with *L. Villarsii* Lois. But in Syst. Nat. ed. x. p. 1194, where he first created *L. hirtus*, *Crepis nudicaulis* is not referred to that species, but hesitatingly thought to be a variety of *L. hispidus*. There is no specimen of *Crepis nudicaulis* in the Linnean Herbarium. There might therefore be some excuse for rejecting the specific name *nudicaulis* as uncertain and ambiguous, but if used at all it must, as the oldest, be substituted for *Leontodon hirtus* L. and consequently for *L. Villarsii* Lois. It cannot be substituted for *Thrincia hirta* Roth (whether that species be transferred to *Leontodon* or not), as suggested by Mr. Britten in Journ. Bot. xlv. p. 31 (1907). *Leontodon nudicaulis* Mérat in Ann. Sci. Nat. xxii. p. 109 (1831), quoted by Williams, Prodr. Fl. Brit. i. p. 70 (1901), as synonymous with *T. hirta*, is a mere misprint or slip of the pen on the part of Mérat, who only transfers to *Leontodon* a *Thrincia* wrongly quoted by him as *T. nudicaulis* Lag. But no such name exists. Lagasca, Gen. et Spec. Nov. p. 24 (1816), wrote *nudicalyx* not *nudicaulis*, so that Mérat's *Leontodon* must either be altered to *nudicalyx* or treated as a nullity.

II. That LEONTODON HIRTUS of Linnæus * was rightly interpreted by Villars and is identical with *L. Villarsii* Lois. results from (*a*) the characters; (*b*) the southern habitat; (*c*) the synonyms, which, although not all applicable to *L. Villarsii*, absolutely exclude *Thrincia hirta*; (*d*) the Linnean Herbarium, which contains two, and only two, specimens named *hirtum* by Linnæus, both being indisputably *L. Villarsii*, one received from Allioni and the other grown in Hort. Ups.

This view has been clearly stated by Villars (1789), Wallroth (1822), Richter (1834), Koch (1837), Bischoff (1851), and Rouy (1907), and accepted by Beck (1893) and Williams (1901). But the evidence from the Herbarium, which clinches the argument, is now brought forward for the first time.

The contrary theory, that *Leontodon hirtus* is *Thrincia hirta* Roth, started with Dillenius (1719) and Buxbaum (1721), who were followed by Leysser (1761), Leers (1775), Roth (1788 and 1797), and above all by Willdenow (1800), who consequently, in Sp. Pl. iii. p. 1552, creates *Apargia Villarsii* for Villars's *L. hirtus*—a name subsequently transferred by Loiseleur, Fl. Gall. ii. p. 514 (1807), to the genus *Leontodon*. It is probably to the influence of Dillenius, as editor of the third edition of Ray's *Synopsis* (1724), that a plant gathered by Bobart near Oxford is there (p. 167) wrongly referred to synonyms of Bauhin and Colonna, which were afterwards taken up (that of Colonna only by implication) by Linnæus for his *Crepis nudicaulis* and *Leontodon hirtus*, although really belonging to *L. crispus* Vill., as had been well known to Ray himself. Thus were the tares sown that produced their crop in the pages of Hudson, Sibthorp, Smith, Sowerby and Syme and Bentham.

To prove the identity of *L. hirtus* L. with *L. Villarsii* conclusively, and to trace the growth of the contrary error, involves a discussion of a good many pre-Linnean synonyms and other matters of research which few will take the pains to seek out for themselves. Unfortunately, it is not possible to do this concisely. As to the old synonyms quoted by Linnæus, some can be identified with certainty, and it is on these that we must rely; some are doubtful; some are clearly wrong, *i. e.* incompatible with the others or with his diagnoses and characters. The only way to make them intelligible is to take the names in chronological order, including a few not directly referred to by Linnæus. These are they, and I will point out at once that one only, and that doubtfully, can be understood to apply to *Thrincia hirta*.

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* Linnæus wrote *hirtum*, but it is surely the ne plus ultra of pedantry to perpetuate the false genders of Linnæus, or of other authors who, like him, "in Greek are sadly to seek." The cases of *Stachys* and *Orchis* are different, for although these words are masculine in Greek, they at any rate *seem* to be used as feminine by Pliny, from whom they were adopted.

1. Colonna, Ecphrasis, p. 244 (1606), with figure on p. 243, describes *Hieracium alterum saxatile montanum*, "quod inter saxorum rimas oriri observavi." This plant from the habitat, the description, and the figure is certainly *Apargia saxatilis* Ten. (transferred by Reichenbach to *Leontodon*), for which it is quoted by Tenore himself in Fl. Nap. ii. p. 168 and Sylloge, p. 593, so here we have safe ground. *L. saxatilis* is nearly, if not quite, identical with *L. crispus* Vill.*, and for the purpose of this inquiry may be treated as identical. Villars, Dauph. iii. p. 85, quotes Colonna's name as synonymous with *crispus*.

2. Caspar Bauhin, Prodr. p. 63 (1620), describes and figures as no. i., *Hieracium dentis leonis folia* (*sic* pro *folio*) *hirsutie asperum minus*, adding "Monspelii provenit" and "florem aureum." The figure is very like that of Colonna and clearly represents *L. crispus*, not *L. Villarsii*, and far less *Thrincia hirta*. It is quoted by Villars for *crispus*, and by Linnæus for *L. hispidus* var. β. in Sp. Pl. ed. 1, p. 799, but for *Crepis nudicaulis* on p. 805 and for *L. hirtus* in ed. 2, p. 1123. This plant will hereafter be referred to as CB. i.

3. Ibidem, no. ii., *Hieracium minus glabrum*, "apud nos circa autumnum florens, in agris reperitur." In the same author's Pinax this becomes no. viii., *H. minus glabrum foliis eleganter virentibus*; "hoc 2 est in Prodr.," a phrase which puts it far away from the *hirtus* of Linn., who does not cite it. It is only mentioned here, because, as we shall see, Villars, commenting on Dillenius, misused this no. ii. Ray mentions it in Hist. i. p. 236, among species that he had not seen. Its identity is uncertain; might it not be *L. autumnalis*?

4. Ibidem, p. 66, no. xix., *Hieracium pumilum saxatile asperum, radice præmorsa*. "In Alpibus provenit," and "florem subluteum," with a figure which will not do for *L. Villarsii* or for *L. crispus*. This has been referred to *Thrincia hirta* by Hudson, Fl. Angl. p. 297 (1762), and others. Villars mentions it three times, under *L. hirtus* at p. 83, *L. proteiformis* at p. 89, and *Hyoseris taraxacoides* at p. 167, but from the notes on pp. 89 and 167 his own opinion was clearly in favour of *L. proteiformis* = *L. hispidus* L., and I think correctly, for neither the root nor the leaves shown in the figure are those of *Thrincia hirta*. If Bauhin's account be read through, it will be seen that he grouped three or four different plants under the above phrase, which does not facilitate their identification. Ray, Hist. i. p. 246, under this name describes leaves "longis pediculis (*sic*) donata, uncias tres quatuorve longa, semiunciam lata," and also calls the flower "subluteum." This may point to *Thrincia hirta*, but the identity remains exceedingly doubtful. Linnæus only quotes this Bauhin name for *L. hirtus* in the *Mantissa*, where he has copied from Gerard several fresh synonyms that conflict with those of his earlier works. This will be referred to as CB xix.

5. C. Bauhin, Pinax, p. 127 (1623), no. x., *Hieracium dentis leonis folio hirsutie asperum minus laciniatum*, quoting as synonymous Colonna's plant. This CB x. therefore is *Leontodon saxatilis*,

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* Ball in Ann. Nat. Hist. vi. considers them specifically distinct, giving characters in support of his opinion.

practically = *L. crispus*, and is cited in Sp. Pl. ed. 1 for *L. hispidus* var. β. and also for *Crepis nudicaulis*, but in ed. 2 for *L. hirtus*.

6. Ibidem, no. xi., *Hieracium dentis leonis folio hirsutie asperum magis laciniatum*, "quod in Prodr. i. est." It is therefore *L. crispus*, though cited in Sp. Pl. ed. 1, for *L. hispidus* var. γ. as well as for *Crepis nudicaulis*, but in ed. 2 for *L. hirtus* *.

7. Ibidem, no. ix., *Hieracium asperum flore magno dentis leonis.* Wrongly quoted by Linnæus, in the *Mantissa* only, for *L. hirtus*. Ray, Hist. i. p. 245, had recognised in it his "Dandelion Hawkweed" = *L. hispidus* L., to which it is also referred by Villars, p. 89.

8. J. Bauhin, Hist. ii. p. 1038 (1651), describes and figures a species very different from any of the above as *Hieracium parvum hirtum, caule aphyllo, crispum ubi siccatum*, "a multis annis habemus Monspelii lectum." Hereafter referred to simply as JB. It is an excellent figure of *L. Villarsii*, to which it is referred by Villars himself, p. 82. Ray knew the species well, giving an interesting description of it in Hist. i. p. 246, where he says, "caulem tactu asperum et singularem," and "folia ex radice gracili complura per terram sparsa densa rigidaque lanugine spinula quodammodo imitata, hirta et incana, semiunciam aut duas uncias longa, satis lata, divisione Erucæ purpureæ nobis dictæ; siccata crispa videntur. Nos quoque in agro Monspessulano (legimus)." Note the proportion and shape of the leaves, which is characteristic of *L. Villarsii* †. Here we have the source of the specific name *hirtus* adopted by Linnæus, who, as before, quotes the synonym for *L. hispidus* β. and γ., and for *Crepis nudicaulis* in Sp. Pl. ed. 1, but for *L. hirtus* in ed. 2. Ray's interpretation of the early names is of the greatest importance. No other botanist knew so many species or was so nearly infallible in regard to those he speaks of. Had Linnæus paid as much attention to Ray as to some other authors, whose entire volumes are not worth a page of Ray, many of the confusions in the *Species Plantarum* might have been avoided.

9. Tournefort, Inst. p. 468 (1700), *Dens Leonis foliis hirsutis et asperis saxatilis*, quoting as synonyms Colonna and CB x. This name is not alluded to by Linnæus, but is rightly quōted by Villars, p. 84, for *L. crispus*, although, in consequence of Dillenius's heresy, he had quoted CB x. for *L. hirtus*.

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* Dillenius, Cat. Pl. Giss. p. 114 (1719), argues that C. Bauhin must have (accidentally ?) transposed his *minus* and *magis* in the Pinax, and that really CB i. = CB x. and Colonna's plant = CB xi. This idea was probably suggested by the occurrence of the word *minus* in CB i. as well as in CB x., but the argument rests on the false assumption that the plant found at the "little mill" near Giessen is CB i. = CB xi., which of course is impossible. and on the fact that this Giessen plant is not that of Colonna. Moreover, he contradicts himself, for he first assumes CB i. = CB xi. and then tries to prove that CB i. = CB x. His remarks may therefore be ignored, although Villars, p. 85. note 1, seems to accept them ; but that note farther confuses matters by bringing in the second species of Bauhin's Prodromus, which, as we have seen, has nothing to do with the question, and is not alluded to by Dillenius.

† There is a specimen in Herb. Sloane, vol. 166, p. 21. The volume of Herb. Sloane being temporarily inaccessible, I have not been able to inspect the specimens of this and allied species referred to in the margin of the Mus. Brit. copy of Ray's *Historia*.

10. Ibidem. p. 469, *Dens Leonis foliis minimis hirsutis et asperis* with JB as a synonym. This name of Tournefort is therefore correctly quoted for *L. hirtus* in the *Mantissa* and also by Villars, p. 82.

11. Gerard, Fl. Galloprovincialis, pp. 166, 167 (1761), rearranges, not very clearly, the allied forms of *Leontodon* found in this district, apparently following the ideas of Garidel, Hist. p. 150 (1715). Linnæus in the *Mantissa* seems to have accepted this arrangement and to have been misled by Gerard into quoting the inapplicable synonyms CB ix. and CB xix. The citations of Gerard's own phrases in the *Mantissa* may be ignored, as they throw no light on the problem.

We thus find Linnæus quoting:

(1) JB., from which he adopts the name *hirtus* and which is *L. Villarsii*, under *L. hispidus* var. γ. in Sp. Pl. 1, p. 799 and under *L. hirtus* in Sp. Pl. 2, p. 1123 and Mant. p. 458.

(2) CB i., which is *L. crispus*, under *L. hispidus* var. β. in Sp. Pl. 1, p. 799, under *Crepis nudicaulis* ibid. p. 805, and under *L. hirtus* in Sp. Pl. 2, p. 1124.

(3) CB xix., which is probably *L. hispidus*, though not impossibly *Thrincia hirta*, under *L. hirtus* in Mant. p. 458 only.

(4) CB x. and CB xi., which are *L. crispus*, under *L. hispidus* β. and γ. in Sp. Pl. 1, p. 799, under *Crepis nudicaulis*, ibid. p. 805, and under *L. hirtus* in Sp. Pl. 2, p. 1123.

(5) CB ix., which is some form of *L. hispidus*, under *L. hirtus* in Mant. p. 458 only.

(6) Tournefort's *Dens leonis foliis minimis hirsutis asperis*, which is *L. saxatilis*=*L. crispus*, under *L. hirtus* in Mant. p. 458 only.

(7) Certain names of Gerard in Mant. p. 458 only, which may be ignored.

Now, although these synonyms are conflicting, it is clear that only one, introduced in the *Mantissa* among other afterthoughts, could possibly refer to *Thrincia hirta*; that the introduction of CB ix., "Dandelion Hawkweed" is obviously an error; that those which belong to *L. crispus* are only three repetitions of the same thing; and that the one which indisputably represents *L. Villarsii* is the parent of the name *hirtus*. We may therefore regard this last as predominant and conclusive.

To pass from the old synonyms to Linnæus's own descriptions. He recurs four times to *Leontodon hirtus*.

(A) In Syst. Nat. ed. x. p. 1194 (1759) as "L. calyce toto erecto læviusculo, foliis dentatis hirtis; setis simplicissimis (!)"; identified with vars. β. and γ. of *L. hispidus* of Sp. Pl. ed. 1, but not with *Crepis nudicaulis*, which is hesitatingly referred to the preceding species *L. hispidus* as "forsan hujus varietas." No habitat is assigned. The above-diagnosis is repeated on every subsequent reference to *L. hirtus*.

(B) In Sp. Pl. ed. 2, p. 1123 (1763), with the same diagnosis and the additional characters; "Folia pilis apice indivisis (2); radius corollæ subtus etiam luteus nec virescens (3); pappus plumosus (4)." The diagnosis, but not the name, of *Crepis nudicaulis* is now quoted as a synonym, as well as *L. hispidum* vars. β. and γ. The habitat is Helvetia, Gallia Narbonensis, Hispania.

(C) In Syst. Nat. ed. xii. p. 522 (1767), with the same diagnosis and the further characters: "Folia rigidula, tactu quasi arida (5), laciniis obliquatis (6); calycis foliola extima dilatata mediante plica." No synonyms or habitat are mentioned.

(D) In *Mantissa*, p. 458 (1771), no new characters are assigned; four fresh synonyms are introduced; *Crepis nudicaulis* is not alluded to, but *L. hispidum* vars. β. and γ. are excluded and referred back to their original position under that species, apparently in deference to the arrangement in Gerard, Prov. p. 166.

Of the various characters no less than six—those numbered—are incompatible with *Thrincia hirta* or with any other species than *L. Villarsii*: (1) "setis simplicissimis" and (2) "folia pilis apice indivisis" are different ways of expressing that without considerable magnification the hairs appear simple, as shown in Villars' figure of his *L. hirtus*, Dauph. iii. tab. xxv. But in *Thrincia hirta*, as in *L. crispus*, they visibly fork into two or three points at the tip. (3) "Radius corollæ subtus etiam luteus nec virescens." This excludes both *L. hispidus* and *Thrincia hirta*, in both of which the difference of colour in the lower surface of the ligules, varying from greenish to livid or reddish brown, is conspicuous and still plainly visible in old exsiccata of the middle of last century. But it does not exclude *L. crispus*, which also has ligules yellow underneath. (4) "*Pappus plumosus*": this seems to exclude any *Thrincia*. (5) and (6) "Folia rigidula, tactu quasi arida" and "laciniis obliquatis." These leaf characters are very distinctive of *L. Villarsii* and quite fatal to the claim of *Thrincia hirta*. *Leontodon crispus*, if not so obviously excluded by (5), is quite incompatible with (6), a phrase which may be compared with Ray's "folia divisione Erucæ purpureæ." Thus the characters are even more decisive than the synonyms in favour of *L. Villarsii*.

Now for the Linnean specimens. There are four sheets pinned together *. But of these only two have been named by Linnæus himself, and both are precisely *L. Villarsii*. Another is *Leontodon pyrenaicus* Gouan, and the fourth is *Thrincia hirta* Roth. But neither of the latter have been named by Linnæus, or indeed bear any writing of his except the abbreviation "All." on the sheet of *L. pyrenaicus*. Three of these specimens, viz. the two *L. Villarsii* as well as the *Thrincia hirta* bear the words "*hirtum* D. Afzel." written in pencil by Smith. How Smith obtained Afzelius's determination of them does not appear; but it is worthless, confusing as it does two such very dissimilar plants. They have also been examined and ticketed by Schultz Bipontinus: unfortunately his ticket, now attached to the uppermost and most important specimen, has obviously got misplaced by some accident, for it says "*Scorzonera macrocephala* DC.," an impossible determination for him to have suggested. *Scorzonera macrocephala* DC. Prodr. vii. p. 122 (1838) is defined "glabra, fol. confertis sessilibus linearibus . . . . capitulum 2 poll. longum, pollicem et ultra latum."

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* Dr. Daydon Jackson informs me that he has not been able, in the course of his researches into the history of the Linnean herbarium, to ascertain to whom the pinning together of sheets is to be attributed, though in some cases it may have been done by Linnæus himself.

To go into farther detail as to these four specimens, they are:

(1) A small and unmistakable example of *L. Villarsii* received from Allioni, on which Linnæus has written "*hirtum*" and "All." and *a tergo* "Hieracium parvum hirsutum, caule aphyllo, crassum ubi siccatum. J. B. Allion. distinguendum ab Hieracio caule aphyllo hirsutum J. B. Est C. B. prodr. diversum ab hispido pilis indivisis, calyce glabro" and "ex agro nicensi."

This sheet also bears "hirtum D. Afzel." in Smith's hand and the impossible label of Schultz' above referred to.

(2) An undoubted piece of *Thrincia hirta* Roth. without any writing of Linnæus' and *sine loco.* To this also Smith has written "hirtum D. Afzel." and Schultz has ticketed "*Thrincia hirta* Roth."

(3) A luxuriant specimen of *L. Villarsii* grown in Hort. Upsala, to which Linnæus has written "H. U." and "*hispidum*," cancelled and corrected to "*hirtum*," then *a tergo* "cujus pili non apice stellati." Smith has again added "*hirtum* D. Afzel." and Schultz has ticketed "*L. Villarsii.*"

(4) A small example of *Leontodon pyrenaicus* Gouan, Ill. p. 55, tab. 22. figs. 1 & 2 (1773)=*Picris saxatilis* All. Ped. i. p. 211, tab. 14. fig. 4. This bears no writing of Linnæus except "All.," showing that it came from Allioni. The label in Allioni's hand gummed to the sheet says "Taraxacum foliis integris dentatis, calyce hispido, pappo plumoso Hall.," which is one of the synonyms quoted by him for his *Picris saxatilis.* There is no writing of Smith's on this sheet. Schultz has ticketed it "*Leontodon pyrenaicus.*"

This is surely enough to establish the identity of *L. hirtus* L. with *L. Villarsii.* The possibility of taking it for *Thrincia hirta* seems due to the mistake having already occurred before the publication of the Linnean name. Dillenius, Cat. Pl. Giss. p. 114 (1719), fancied that he had found C. Bauhin's *Hieracium Dentis leonis folio hirsutie asperum minus* at Giessen, "ad molendinum parvum," and Buxbaum, Enum. Pl. Hall. p. 96 (1724), quotes *Hieracium parvum hirsutum, caule aphyllo, crispum ubi siccatum* J. B. (with Tournefort's synonym also) for the fields near Halle. In both cases the plant must have been *Thrincia hirta*, ex loco, and the old Bauhin names are wrongly dragged in.

When Leysser wrote his *Flora Halensis* (1761) *Leontodon hirtus* had made its appearance in Syst. Nat. x. (1759) with a reference to Sp. Pl. i. p. 799, which brought in as synonymous the very Bauhin name that Buxbaum had quoted, so he not unnaturally (p. 145) referred the Halle plant to the Linnean species, as yet very meagrely described. So far we have nothing but the north German habitat to identify the plant of these three authors with *Thrincia hirta*, but the characters assigned to *L. hirtus* by Leers, Fl. Herborn. p. 168 (1775), are those of *T. hirta*: "corollulæ lividæ, demum flavæ" and "semen corollæ extimæ calyculo brevi loco pappi coronatum."

Leysser in his second edition of 1783, p. 191, at last notices that the Linnean "pilis simplicissimis" will not fit the German plant, but instead of suspecting an error on his own part, calmly alters those words into "setis furcatis" without any explanation. Roth, in Tent. Fl. Germ. i. p. 333 (1788), only quotes *L. hirtus* with the Linnean diagnosis as found "in pratis et pascuis humidis totius fere Germaniæ," but in Catalect. Bot. p. 98 (1797) he transfers *Leontodon hirtus* to his new genus *Thrincia* without alluding to Linnæus or to Villars, although he had seen the latter author's work, for he refers *Hyoseris taraxacoides* Vill. (wrongly) to *Thrincia hispida*. He says of *T. hirta* "folia pilis bi- seu trifurcatis," apparently unconscious that this one character proves it not to be the Linnean *L. hirtus*. Then he quotes CB i. and JB, saying of the latter "cum figura bona," which only shows how easily figures can be misreferred by those who are not acquainted with the plant that they really represent.

The great authority of Willdenow and his deliberate creation of a new name for the *L. hirtus* of Villars no doubt propagated the erroneous opinion, which had been combated by Wallroth, Sched. Crit. Fl. Hal. p. 441 (1822); by Richter, the compiler of the *Codex Linnæanus*, in *Flora*, 1834, p. 661, where he says "the Linnean plant is and remains the by him fully characterised south European one, immediately recognisable by its marginal florets being yellow underneath, as already remarked by Wallroth. An error of Roth's can alter nothing here"; by Koch, Syn. p. 417 (1837), under *Thrincia hirta*, "*Leontodon hirtum* L. ex Sm. sed descriptio Linneana accuratius in *Leontodon Villarsii* quadrat"; by Bischoff, Beitr. p. 43 (1851); and by Rouy in Bull. Soc. Bot. Fr. liv. p. 52 (1907). It is strange that most British botanists should have overlooked or ignored the protests of all these authors. Has it not occurred to them that a plant from the sunny hills—not the high mountains—of Dauphiné is *a priori* more likely than one from the meadows of Germany to represent a species known to Linnæus from Southern France and Spain, and to his predecessors from Montpellier?

III. What is the correct name for *Thrincia hirta* Roth, whether under *Thrincia* or under *Leontodon*, seeing that neither the Linnean *hirtus* nor the Linnean *nudicaulis* can be employed for this species? It is undoubtedly that of Villars, who knew the plant well and named it *Hyoseris taraxacoides* in Prosp. Dauph. p. 33 (1779) with a brief, but intelligible, diagnosis. It was taken up by Allioni, Ped. i. p. 227 (1785), as *Rhagadiolus taraxacoides*, and then again described and figured admirably by Villars in Hist. Pl. Dauph. iii. p. 166, tab. xxv. (1789), where he distinctly states that it is perennial. The identity of *Hyoseris taraxacoides*, Vill. with *Thrincia hirta* Roth is obvious. and the species must be called *Thrincia taraxacoides*, comb. nov.*, notwithstanding Roth's having wrongly quoted

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* Those who merge *Thrincia* in *Leontodon* will have to say *Leontodon taraxacoides* as another new combination, for *L. taraxacoides* Mérat in Ann. Sci. Nat. xxii. p. 108 (1831) is a nullity. He quotes "*Leontodon taraxacoides* Willd.," a name that does not exist, and only gives a diagnosis insufficient for the recognition of his plant, though I think he not improbably meant to quote Villars, but accidentally wrote W. for V. in some memorandum, which then expanded into Willd. His paper is full of similar slips, and altogether so bad a piece of work that it has been entirely ignored by Rouy.

Villars' name as synonymous with *Thrincia hispida* instead of with *T. hirta* (Catalect. Bot. iii. p. 103), an error repeated by Gaudin, Fl. Helv. v. 49 (1829), under the name, there appearing for the first time, of *Thrincia taraxacoides*. Koch, however, Syn. ed. 2, p. 480 (1843), and ed. 3, p. 358 (1857), protests "*T. hispida* Roth = *T. maroccana* Pers. per errorem in Flora nostra introducta fuit." Gaudin's *T. taraxacoides* was therefore stillborn and must be ignored *.

THE LAMELLÆ OF POLYTRICHUM.

By W. R. Sherrin.

The determination of certain species of *Polytrichum* has proved more or less difficult to beginners on account of the superficial resemblance of allied forms. This difficulty is largely due to the reluctance of the student to prepare thin transverse sections of the leaf, which would show the difference at once. Two of the most troublesome species to separate without recourse to transverse sections are *P. commune* and *P. formosum*, and it occurred to me to examine a number of specimens of these to determine how they might be distinguished more readily and without using the razor.

The most satisfactory results were obtained by scraping the lamellæ off the surface of the leaf. In this way preparations were quickly obtained which afforded a good lateral view of the lamellæ; and on comparing similar preparations of the two species, it was obvious that the plants could be easily separated by the characters of the cells of the upper marginal row. The grooved margin of *P. commune*, though more distinct in transverse section, can still be made out by careful focussing, for it tends to give the edge a confused or doubled margin; whereas in *P. formosum* the edge appears simple and sharply defined. In the accompanying illustration (p. 106) the upper figures illustrate the lateral view of the lamellæ, the lower figures show these lamellæ in transverse section.

The grouping of these and the remaining species of *Polytrichum* by characters derived from the lateral view of the lamellæ is very distinctive, and coincides with the systematic arrangement already in use in the *Handbook of British Mosses* by Dixon and Jameson. The groups may be tabulated thus:—

I. *P. nanum*, *P. aloides*.
II. *P. urnigerum*, *P. alpinum*, *P. sexangulare*.
III. *P. piliferum*. *P. juniperinum*, *P. strictum*.
IV. *P. gracile*, *P. formosum*.
V. *P. commune*.

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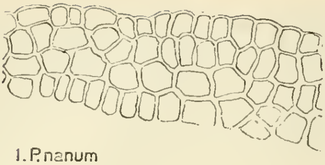
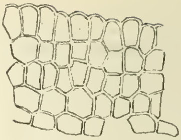
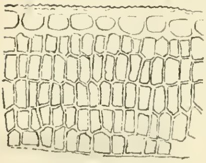
* *T. hispida* is an annual species from Spain, Morocco, Madeira, &c. A misprint has crept into Mr. Britten's synonymy, op. cit. p. 38, *Thrincia nudicaulis* Lowe, Prim. Fl. Mad. does not belong to *T. hirta* but to *T. hispida*, as stated by Lowe himself in Man. Fl. Mad. p. 532.



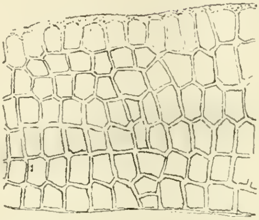
1. P. nanum



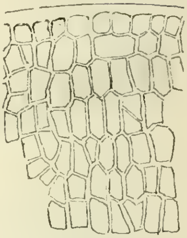
2. P. aloides



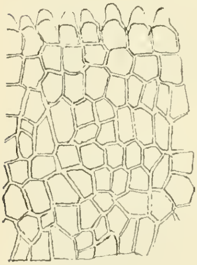
3. P. urnigerum



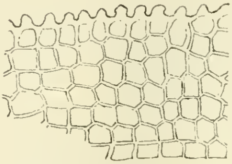
4. P. alpinum



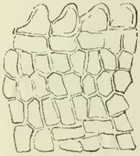
5. P. sexangulare



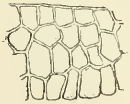
6. P. piliferum



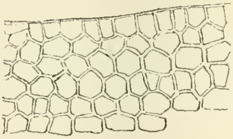
7. P. juniperinum



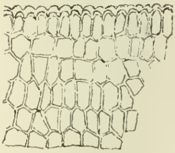
8. P. strictum



9. P. gracile

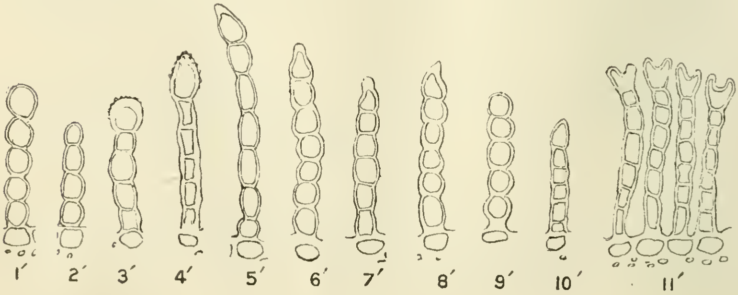


10. P. formosum



11. P. commune

1 – 11 Lamellae in lateral view.



KEY TO THE GROUPS.

A. Upper margin of lamella straight (sometimes finely papillate).
- *a.* Marginal cells clearly differentiated from the rest; colour yellowish .... Group II.
- *b.* Marginal cells not differentiated .... Group IV.

B. Upper margin of lamellæ more or less crenate or serrate.
- *a.* Margin slightly but distinctly crenate.
  - *a′.* Lamellæ with doubled margin, caused by apical cell being more or less grooved .... Group V.
  - *b′.* Lamellæ with single margin .... Group I.
- *b.* Marginal cells or their thickened walls very strongly projecting .... Group III.

NOTES ON THE GROUPS.

Group I. In these plants the apical cells are rounded, giving to the margin an irregular, crenate outline. Both vary very much in the depth of the lamellæ, and also in the thickness of the cell walls. There is practically no difference in the lamellæ of value for distinguishing the two species.

Group II. The members of this group are characterised by the yellowish thickened walls of the marginal cells. The species may be distinguished as follows:—

A. Marginal cells papillate.
- *a.* Marginal cells longer than broad .... *P. alpinum.*
- *b.* Marginal cells subquadrate .... *P. urnigerum.*

B. Marginal cells not papillate .... *P. sexangulare.*

Group III. The cells of the lamellæ of the plants in this group are much alike; but the species may be separated by the characters of the marginal cells:—

A. Lumen of the marginal cells not included in the projection. Outer thickened wall creniform .... *P. juniperinum.*

B. Lumen of the marginal cell more or less included in the projection.
- *a.* Lamellæ 9–11 cells deep .... *P. piliferum.*
- *b.* Lamellæ 6 cells deep .... *P. strictum.*

Group IV. The lamellæ in this group are characterised by the marginal cells being undifferentiated; the cell walls are of equal thickness throughout. The lamellar characters are of no assistance in separating the species.

Group V. There is only one species in this group, *P. commune* in which the marginal groove of the lamellæ is well marked. But in the varieties *minus* and *perigoniale* the groove is less evident, and, but for the thickened and slightly crenulated margin and deeper lamellæ, they might be confused with Group IV.

WATSON EXCHANGE CLUB REPORT, 1916–17.

[We have already referred (p. 32) to some features of this Report, and proceed, in accordance with our usual custom, to make a few extracts relating to some of the more interesting plants contained in it: others have already been noticed in this Journal. For notes on such critical genera as *Batrachium*, *Viola*, *Rubus*, *Rosa*, *Hieracium*, and *Euphrasia*, reference must be made to the Report itself. For the convenience of general readers, we have printed in full the names of writers indicated in the Report by initials only.—Ed. Journ. Bot.]

Reseda alba L. Waste ground, cliffs, Bournemouth, S. Hants., v.e. 11, Aug. 8, 1916.—H. C. Littlebury. I am doubtful if our *Reseda alba* is identical with the very fleshy and more shrubby *R. suffruticulosa* L. of Mediterranean sands, as generally supposed. Even on the Bristol Channel, where it is naturalised near the sea, I have not seen quite similar plants to those in the south, where it is native. J. D. Hooker followed Bentham in taking the name of *alba* for the British plant, "which most authors agree in considering the same with *fruticulosa* and *suffruticulosa*."—H. S. T.

Helianthemum Chamæcistus × *polifolium*. Purn Hill, Bleadon, N. Somerset, v.e. 6, May 20 and 23, 1916. With the parents. First discovered by the present contributor in July 1888, since when it and *polifolium* have greatly extended in range. See Gard. Chron. Nov. 11, 1916.—H. S. Thompson.

Erodium cicutarium L'Hérit., var. *triviale* Jord. Barrow Hill, Newton St. Loe, N. Somerset, v.e. 6, June 7, 1916. Petals not spotted.—Ida M. Roper . . . . . . This is a form of *Erodium triviale* Jord. We have compared it with Jordan's type in Herb. Mus. Brit. It is more glandular, but has the long rostrum to the fruit, the non-spotted flowers, the distinct ridge round the foveola, and the acute segments of the leaves, which are distinguishing features of this species. It would greatly facilitate the determination of plants of this genus if members would kindly note: (*a*) colour of stigmas, anthers, pollen and petals; (*b*) are petals equal or unequal, and spotted or not spotted, also the diameter of expanded flower should be noted.—E. G. Baker and C. E. Salmon.

[We hope in due course to publish the results of the study of *E. cicutarium* and its forms upon which the writers named have for some time been engaged: what is referred to as the "type" should we think rather be styled an authentic specimen.—Ed. Journ. Bot.]

Trifolium squamosum L. (=*T. maritimum* Hudson). Sub-maritime pasture by R. Avon, below Bristol, W. Glos., v.e. 34, July 11, 1916, and Sea-bank by roadside at Uphill, N. Somerset, v.c. 6, July 28, 1916. This plant does not grow in "salt marshes," at least in the west of England, but in sub-maritime pasture land, the habitat given in White's *Flora of Bristol* J. D. Hooker says "salt marshes and meadows" (*Student's Flora*); Hooker and Arnott (1850) gave "salt marshes" as the habitat: and even Babington gave "muddy salt marshes." In Cornwall, Davey said it grew on "Roadsides and waste places near shipping. Very rare."—H. S. Thompson.

T. repens L., var. *Townsendii* Bab. This occurred, in 1903, in Moccas Park, near Hereford, whence a root was brought to Underdown, Ledbury, where it flourishes and retains its colour. July 20, 1916.—S. H. Bickham. Mr. N. E. Brown, in the Supplement to *English Botany* ed. 3, gives var. *rubescens* Séringe as an earlier name.—E. S. Marshall.

[Mr. Townsend's plant was first noticed by Babington in the first volume of this Journal (p. 216: 1863) and described by him in vol. ii. p. 1, with plate by W. H. Fitch: in neither place is the variety named. It may be noted that Babington (*op. cit.* p. 3) suggests the identity of Townsend's plant with var. *rubescens* Séringe.—Ed. Journ. Bot.]

Lotus uliginosus Schkuhr, var. *glabriusculus* (Bab.). Freshwater Gate Marsh, I. of Wight, v.c. 10, Sept. 16, 1916. (Cp. B.E.C. Report, 1914, p. 136.) Further study of this plant inclines me to think it more than a form due to situation. It was in great abundance in the marsh and constant in character. A mile away on wet ground in Freshwater Marsh the hairy form (var. *villosus*) was growing, and there I could not find the less hairy plant. Not mentioned in Fl. Hants. 1904. (*See* B.E.C. Report, 1914, p. 136).—W. C. Barton.

Saxifraga grœnlandica L., var. nov. *Griffithii* (Guermonprez). Root from Cwm Idwal, Carnarvonshire. Cult. Bangor, July 1916.—J. E. Griffith. The two small specimens sent to me have no barren shoots, but they are certainly the same as a very well-marked Saxifrage which I gathered in Cwm Idwal (it apparently hybridizes with *S. hypnoides* L.), as well as on and near Snowdon in 1912. Mr. F. N. Williams identifies this as the Welsh plant named *S. leptophylla* Pers. by D. Don (Trans. Linn. Soc. 1822 [xiii.] pp. 450–1); but he doubts the correctness of the identification, and proposes to call it *S. arvonica*. Persoon's description, in his *Synopsis*, i. p. 490, is very brief and vague; and I have seen no authentic specimen.—E. S. M.

Peplis Portula L., var. *longidentata*. Boiss. et Reut. **(1)** Ref. No. 220 A. Drying mud of pond and ditch in a wood (alt. 800 feet), Llandrindod Wells, Radnorsh., v.c. 43, Aug. 15, 1916. **(2)** Ref. No. 220 B. Dry mud in ditch on open hillside (alt. 1000 feet), Llandrindod Wells, Radnorsh., v.c. 43, Aug. 15, 1916. It should be noted that 220 B was growing in a situation quite as exposed as 219, and on drier mud, so that the development of the calyx can scarcely be due to situation, and that there was no admixture of forms.—W. C. Barton. According to Rouy and Camus, Fl. de France, viii. p. 167, Boissier and Reuter made this a species; J. Gay is the varietal authority. The calyx-characters are right, but the petals are said to be "orangés," whereas these are pink, in Mr. Barton's gatherings.—E. S. M. This *P. longidentata* of Gay was, in 1878, given by Nyman in his Consp. Fl. Europ. as native of Spain and Portugal only; in the later edn. France was added. Nyman makes it a subspecies, but the difference seems hardly enough for that. Gay's original specimens are in the Kew Herbarium. I have the same form from the Isle of Colonsay, v.c. 102, gathered by M. McNeil, who says it "covers a sun-dried pool near Strand." Another approaching it from Witley.

Surrey, 1888 (E. S. Marshall).—A. Bennett. In the Report of the Phytogeographical Excursion in the Brit. Isles (New Phytol. 1911), Mr. G. C. Druce published [x. 313] var. *dentata* nov. var. from Co. Kerry and Cornwall (first seen in 1875), which "differs from the type in having much longer teeth to the calyx, and may be described 'Dentibus calycis capsula (1 mm. vel ultra) longioribus.' It forms a passage to the Mediterranean and Western variety *longidentata* J. Gay, and is especially interesting as affording another link with the Iberian flora." Granted this is most interesting, but surely the giving of names to all such "passages" can only lead to chaos. The writer's own specimens of *Peplis* confirm this tendency for the calyx-teeth to become longer in the West. From near Penzance (1888) he has *longidentata*, together with what Mr. Druce would call *dentata*; the same two forms from a stream on Quantock (West Somerset); "*dentata*" from two places in Warwickshire; and the type only from Skipwith Common, E. Yorks.—H. S. T.

[We note with satisfaction this protest and others elsewhere in the Report against what seems to us an unnecessary multiplication of names.—Ed. Journ. Bot.]

Peucedanum sativum Benth. & Hook. [Benth.]. Variety with dissected leaves. Norton Common, Letchworth, Herts., v.c. 20, July 4 and Sept. 1916. Mr. Westell writes regarding this: "My attention was first attracted to this interesting variety of *Peucedanum* in June 1915, when about half a score of plants, confined to a radius of a few square yards, came under my observation on Norton Common, Letchworth. Early in the spring of 1916 I again visited the station, and found, to my delight, that several plants were already showing well; the deeply-cut, parsley-like, leaves seeming to be more pronounced than ever. A search elsewhere was also rewarded with the discovery of, perhaps, twenty more plants. These, I am inclined to think, I had overlooked in 1915. On July 4th, 1916, I gathered a number of the best specimens, and again in September I procured a further collection of leaves from individual plants, and it is from these July and September gatherings that the specimens submitted have been made up. I would point out that each set of specimens exhibited is from one individual plant, and that I discovered individual plants of *sativum*, bearing leaves in a bewildering variety of form, from the type *P. sativum* to the extreme forms I have pleasure in submitting."—J. E. Little.

Atriplex hastata L., var. *genuina* Godron, forma *salina* Moss & Wilmott. Ref. No. 213. On mud in Newton saltpans, I. of Wight, v.c. 10, Sept. 7, 1916. Closely prostrate, leaves thick and fleshy; plant often turning red (=*A. deltoidea*, var. *salina* Bab.). I understand that seedlings from prostrate plants like these carefully self-fertilized came up in Mr. Wilmott's garden indistinguishable from upright *hastata*.—W. C. Barton. This is so named since natural seedlings from plants similar to it developed in garden soil into *A. hastata* var. *genuina* 2½ feet high. Self-fertilized seeds, obtained to test for hybridity, were unfortunately sown in pots and kept rather dry. They came up fairly uniform, 9–12 in. tall, stiff erect, and very like var. *oppositifolia*! Opportunity to confirm these remarkable results has not occurred.—A. J. Wilmott.

A. Babingtoni Woods. Ref. No. 208. Shingle at Brading Harbour, I. of Wight, v.c. 10, Sept. 8, 1916. All from one plant. The inflorescence, hardened yellowish fruit and rhomboid bracteoles put this to *Babingtoni*, as against the green fruit, bracteoles ovate triangular, with base campanulate, and inflorescence leafy to the tip of *virescens*. I have specimens from Brading which match closely Mr. Beeby's plant in Herb. Brit. Mus. certified as *virescens* by Lange himself. But though extreme plants of what Mr. Wilmott in Camb. Brit. Flora groups under *A. glabriuscula* Edm. can be put with certainty to var. *Babingtoni*, or var. *virescens*, I have found no specimen of either variety which does not bear some fruit tending in the direction of the other. I should be glad if any member would send me a series of specimens showing the complete range of *Atriplex* in any locality. To be of use for critical study it is essential that specimens should bear ripe fruit.—W. C. Barton.

Liparis Loeselii [A.] Rich. . . . . The extension of range of this species to Glamorgan !, and Carmarthen ! was of much interest. The specimens from these counties agree with those sent me by Drs. Focke and Buchenau from the Frisian Islands, where they grow associated with *Pyrola rotundifolia* and *minor*, *Parnassia*, *Carex trinervis*, *C. Œderi* and *C. Goodenowii*, *Juncus atricapillus* and *Hierochloe borealis*. The history of its discovery in Carmarthenshire is as follows: Mr. J. W. Barker wrote (June 14, 1906), "In July 1897 a friend of mine, Mr. R. Browne, brought me several plants which he had picked on the Burrows near Pembrey. Amongst them were two plants of a little green Orchis, which were quite new to me. I found to my surprise they were *Liparis*, and I mentioned it to Dr. H. Lewis (who was a member of the Botanical Record Club about 1874), but he scouted the idea of its being *Liparis*. On the 22nd of June, 1899, I walked out to the valley, where to my delight I found 15 to 20 plants of it scattered about. A few years after, Mr. Browne told me that the little valley had entirely changed its appearance, the shifting sand having covered all the vegetation." On the 9th of June the same year Mr. H. H. Knight again discovered the *Liparis*, and sent me specimens, which agreed with Mr. Riddelsdell's from Glamorgan (Sept. 7, 1905). In Carmarthenshire the plant was associated with *Carex glauca*, *C. Goodenowii*, *C. arenaria*, *Salix repens*, *Mentha hirsuta*, etc. Mr. Riddelsdell sent me a list of 42 species with which it grew in Glamorganshire. We have now records of its being gathered in some 29 stations in 6–8 vice-counties. In Britain it seems to occur in abundance in cycles of about 20 years, gradually dying out until a recurrence. At p. 622 (1904) of the Norf. & Norw. Trans. I made the following remark: "It is what would be called a short-lived perennial; probably the year it occurs abundantly it seeds freely, the plants die, and the seed floats about until the water begins to run off the land in May, then the seed settles down and grows. It is well known that at times Orchis seeds take many years to germinate and come to the flowering stage. The water level is high, perhaps for some years, then there comes a dry season (like 1883–4), and the plant is exposed to view." Even in 1884 the ground was so wet that one dared not stop long in one place without fen-boards. There is an excellent description of its growth by Crépin in "Notes sur plantes rares ou critiques de Belgique," Fasc. 3, 102 (1868). He there describes how it has a progressive lateral growth, and one specimen I have shows this for four years, the old stems for 1881–2–3 and 4 still remaining. This, no doubt, is its usual growth, but at times it develops by a vertical growth, as is shown by a specimen sent me by Mr. Fryer, who remarks that this state occurs on Chippenham Fen. It is three inches in height (*i. e.* the root growth). Whether this is to get above the dense vegetation I am unable to say. When grown from seed the plant is only $\frac{3}{4}$-inch high at the end of the first year, the second year it is $1\frac{1}{2}$ inches—how many years it is before it flowers I am unable to say . . .—A. Bennett.

PLANT DISTRIBUTION.

The following is an abstract of the paper on "Plant Distribution from the Standpoint of an Idealist" which was read by Dr. H. B. Guppy at the meeting of the Linnean Society on Feb. 7:—

The paper begins with an appeal in the interests of the study of plant-distribution for the mutual co-operation of the supporters of the original Darwinian theory of evolution and of the later hypothesis of mutation advanced by De Vries. If the view here advocated is correct, that in the history of the Angiosperms we have two main eras—the era of the rise of the great families and the era of their subsequent differentiation—the mutationist would find his most fitting field of work in the older era and the orthodox Darwinian in the later one. Having regard to Darwin's original position respecting the "sport," it is held that the distinction between the two schools is in degree rather than in kind, and that the differences in their standpoints and in their methods find expression in the differences between the two eras concerned. It is argued that the age that witnessed the rise of the great families and the age that witnessed their subsequent differentiation are things apart and cannot be dealt with by the same method. The work that was carried on in the distant Mesozoic ages, when the types of the existing cosmopolitan and pantropical families arose, is not illustrated in the influences at present in operation, unless it be on the abnormal side of plant-life. A family in its truest sense, so it is contended, is born and not made.

Distribution, it is held, is primarily an affair of the larger groups; and the problems with the first claim on the attention of the student, those that centre around the rise of the great families, raise issues that cannot be stated in terms of genera and species.

The papers of Bentham on the Compositæ and of Huxley on the Gentians are taken as starting-points for the discussion, and it is shown that with both families the subject is treated as a matter of the differentiation of a widely spread primitive type. This may be termed *evolution on a plane*; and the implication is that since the rise of the great families in the Mesozoic ages little else has been effected. It is urged that conclusions drawn from the prevailing influences at present in operation could be applied only to the differentiation of the ancient family type successively into tribes, genera, and species, and that the method adopted by many a monographer in dealing with a family is the method that has been followed in nature in this respect. On the origin of the family types such conclusions could have no bearing.

Postulating the original existence of world-ranging generalized family types during an era of uniform conditions, it is argued that the differentiation of these primitive types was in response to the progressive differentiation of their conditions. Allusion is then made to the dilemma in which all theorists find themselves when they come to handle the larger groups, a dilemma where they assume the original high mutability of characters that have been through the ages relatively fixed and immutable. If stable now, why so unstable then? The difficulty has to be faced; and we are led to believe that the age that witnessed the rise of the great families was an age of mutations free and unchecked, the mutability decreasing and the original modifications becoming more and more fixed with the progressive differentiation of conditions. In other words, *mutability* is the watchword for the pre-differentiation era and *adaptivity* for the era that followed. Prominence is given in these connections to the work of Dr. Willis on the Podostemaceæ, and the writer's position with regard to his "Age and Area" hypothesis is defined.

The distribution of families is then treated statistically, and it is shown that whilst they largely ignore the cleavage of the land into two great masses, diverging from the north, they respond in marked degree to the differentiation of the climatic zones. Behind their disregard of the existing arrangement of continents and oceans lies the story of the first era, and behind their ready response to climatic differentiation lies the story of the second era. In the circumstance that the response to the bicleavage of the land-mass is either absent or small in the larger groups and becomes greater and greater as we descend the differentiating scale, until it attains its maximum in the species, is recognized the contrast between the pre-differentiation era and the era when differentiation reigned supreme. It is held that there is a method here disclosed that could only arise through the family differentiating into tribes, the tribes into genera, and the genera into species, since the opposite plan of beginning with the species would produce chaos. . . . With regard to the application of similar views to the distribution of animals, it is contended that the fundamental difference in the schemes of development of plants and animals ought to be reflected in the different application of the doctrine of evolution.

The paper ends with the statistical treatment of the larger groups behind the families; and it is shown that whilst the Dicotyledons display a much greater tendency to detachment from the tropics than do the Monocotyledons, the Sympetalæ stand foremost in this respect amongst all the primary groups.

NOTES ON CORNISH PLANTS.

By F. Rilstone.

Sisymbrium officinale Scop. var. *leiocarpum* DC. In Cornwall this is almost certainly an alien. Whilst the type is found in waste ground and by roadsides in all parts of the county I have, after several years' search, only been able to find this variety near docks or mills, usually in company with other obvious aliens, as at Par, Charlestown, and Falmouth. At Par, in the neighbourhood of the docks and the Beaver Mills where aliens abound, the variety is far more plentiful than the type, but one has to go only a short distance inland to find the type only represented.

Dianthus Armeria L. Plants grown in a garden at Polperro have behaved as biennials. Seeds collected at Hayle on Sept. 1, 1915, and sown early in the following spring developed into strong plants during the summer of 1916, but no flowering shoots appeared. The severe weather of the following winter did the plants no harm, and all flowered abundantly in 1917 during July, August. and September, the normal flowering season. The flowers close early in the afternoon.

Veronica agrestis (agg.). Cornish forms of *Veronica agrestis* (in the aggregate sense) present considerable difficulty. Davey's *Flora of Cornwall* (p. 330) gives the distribution as follows:—

> *V. didyma* Ten.—"Not an abundant weed, but appears to be well distributed throughout the county."
>
> *V. agrestis* L.—"A very common and abundant weed."

I find two forms: One—which as far as my experience goes is of rare occurrence—has the pale flowers, oval sepals, gland fringed at the base, and short style of *V. agrestis*; but the numerous jointed hairs on the stem and pedicels are not "mostly gland-tipped," as Syme says is the case with typical *V. agrestis*. The other—a more frequent but by no means common plant—presents difficulty chiefly in the capsule being rather thickly clothed with short straight or curved glandless hairs with *longer* glandular hairs intermixed. Babington's *Manual* speaks of the hairs on the capsule of *V. agrestis* as "all straight and glandular" and those of *V. didyma* as "short dense glandless hairs and other shorter glandular ones." Neither description fits this plant.

The capsule clothing of the annual species of *Veronica* is possibly an untrustworthy character; in *V. Tournefortii*, which Syme described as sparingly clothed with gland-tipped hairs, I find usually a varying proportion of shorter glandless hairs intermixed, but I have noticed no such variability in the *agrestis* forms.

Linaria Elatine Mill. On a plant of *Linaria Elatine* in a cornfield near Polperro I found a single flower with perfectly regular corolla similar to the peloric form of *L. vulgaris*. All the other flowers were normal forms.

Nitella gracilis Agardh. This pretty little plant, the occurrence of which in West Cornwall was recorded in this Journal for 1912 (p. 348) by Messrs. Groves, appears to be a fugitive species. In the ditch in which it was found it formed in 1911–12 a dense mass. Very little appeared in 1913, since when, despite careful search, I have not been able to find a trace of the plant.

THE LATE ETHEL SARGANT*.

Miss Ethel Sargant, whose premature death was reported in *The Times* of January 23, is a great loss to English botany. Her work was not only accurate and sound, but it bore on questions of fundamental importance. One may venture to say that she was one of the few women who would undoubtedly have been elected into the Royal Society if the Charter had permitted.

Miss Sargant was a person of strong intellect, with a natural bent for scientific research, which she was happily in a position to follow freely, with excellent results. She took Honours in the Natural Science Tripos at Cambridge, but her career as an investigator began a few years later, when she came to Kew, at the close of 1892, to work in the Jodrell Laboratory. It was then that the present writer first made her acquaintance and was at once impressed by her remarkable capacity for difficult research. She very soon settled down to the study of the details of the process of nuclear division. Several of her earlier papers were on this subject, then, as now, of urgent importance for our understanding of the essential reproductive phenomena, common to plants and animals. But in the meantime she had published, in conjunction with the present writer, an investigation of a very different nature, on a pitcher-plant, *Dischidia Rafflesiana*, in which the pitchers, instead of catching insects, serve to collect water and soil.

After leaving Kew, Miss Sargant established a laboratory of her own at home, in which she for some time had the assistance of Dr. Ethel N. Thomas. Her laboratory was admirably equipped with all the appliances for advanced histological research. For a time her work continued to be chiefly concerned with the nucleus. In 1899 she made a communication to the Royal Society, which, though not strictly original, was of great interest, for she was the first in this country to confirm the discovery of the Russian botanist Navaschin, that fertilization in the higher flowering plants is double, the endosperm, or food-tissue, as well as the embryo, being the product of a sexual union of nuclei. This she demonstrated, from her own preparations, made some time before, but then first rightly interpreted in the light of the Russian savant's work.

Concurrently with her later work on cytology, Miss Sargant began a course of investigation, which occupied the remainder of her scientific career, on the comparative anatomy of seedlings. If of less general biological interest, this line of research led to results of more definite importance from a botanical point of view. A joint paper with Mrs. D. H. Scott, on the development of the well-known *Arum maculatum* from the seed, was the first-fruits of this work, which soon, however, assumed a wide scope and led to a theory of the origin of Monocotyledons which has exercised a great influence on the minds of botanists. As is well known, the higher flowering plants have long been divided into the Monocotyledons with one seed-leaf and the Dicotyledons with two. There are many other points of difference, especially in the mode of growth of stem and root. The older botanists had generally held that the Monocotyledons were the more primitive group of the two, but Miss Sargant was led to the opposite conclusion, agreeing in this respect with Professor G. Henslow. But while that author had derived the Monocotyledons from aquatic ancestors, Miss Sargant attributed their peculiar characters to their being essentially and in origin *geophilous*—*i. e.*, plants with underground stems, such as bulbs or root-stocks. The single cotyledon was interpreted by her as a fusion of the two seed-leaves of the other type, a view which she supported by the analogy of certain Dicotyledons of similar habit, such as the Winter Aconite and the Lesser Celandine, in which there is clear evidence of fusion. The Monocotyledons were regarded as an early offshoot from an ancient and simple Dicotyledonous stock. Among Miss Sargant's various memoirs bearing on this subject may be mentioned her interesting hypothetical "Reconstruction of a Race of Primitive Angiosperms" (1908). Whether the details of the theory are ultimately accepted or not, there can be no doubt that the present views of botanists as to the relative antiquity of the two classes have been largely determined by her observations and reasoning.

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* Reprinted by the author's permission from *The Times Literary Supplement* of Jan. 31.

In connexion with this work, Miss Sargant, in her later years, paid special attention to the embryology of the grasses, a subject on which she published two papers in collaboration with Mrs. Arber, the latter of which was the last to appear during her lifetime.

Miss Sargant was the first woman to preside over a section of the British Association. Her able address to the botanical section in 1913 is a valuable critical essay on plant-embryology. She wrote vigorously and logically; in style, as well as in argument and accurate observation, she stood very high among contemporary botanists. Two powerful essays of hers on non-technical subjects may be mentioned—one on "Women and Original Research" (1900), and the other on "The Inheritance of a University" (1901).

Personally Miss Sargant was warmly appreciated and will be sadly missed by her many friends, both scientific and private. She was a woman of a generous character and will long be remembered for her many kindly actions. She was particularly loved by children, whom she thoroughly understood.

D. H. Scott.

[Mr. C. E. Salmon writes: "During her residence in Reigate, Miss Sargant was an active member of the Holmesdale Natural History Club. In 1897 she lectured at the Club on "The Cell of the Nucleus"; in 1898 on "Photomicrography as an Aid to Research"; in 1903 on "The Family Tree of Flowering Plants" and on "The Effect of the Seasons on Plant Life"; in 1909 on "A Modern Development of Field Botany"; in 1913 on "The Native Countries of our Spring Bulbs." When Miss Sargant left Reigate, she was elected an honorary member of the Club in recognition of her valuable services."—Ed. Journ. Bot.]

FELIX GILBERT WILTSHEAR.

(1882–1917.)

More than one young botanist of promise has paid the toll demanded by this country in the course of the terrible War forced upon us by Germany, but these were taken before their work had matured, and before they had established the reputation which they would doubtless have acquired. Hence the death of the subject of this notice at a period when his capabilities were fully developed and when the value of his work had been recognized, not only by his colleagues but by all who had visited the National Herbarium for purposes of study, will be felt by all who knew him as a serious loss and one which it will be difficult to supply.

Felix Gilbert Wiltshear was born in Kensington Jan. 15, 1882: an elder brother, who had preceded him in the Department left in February, 1896, and Felix succeeded him as boy-attendant, being then fifteen years old. He had received an excellent education at St. Mary Abbots School, Kensington, where he had learned to write a very good hand. This led to his employment in the making of indexes to volumes in which these necessary adjuncts to book-work had been omitted or inadequately supplied, and later, as his knowledge and aptitude increased, to some of the Departmental MSS. and collections of drawings, where they stand as evidence of his neatness and carefulness.

At that time the Departmental Library was more or less under my care, and I soon discovered that Wiltshear, although not then directly connected with it, had that *flair* for books and for matters connected with them which, though not easily definable, marks the born bibliographer. In his development in this direction I was able to afford some help; and when, in the interregnum between the resignation of Mr. Murray in 1905 and the appointment of Dr. Rendle, I was in charge of the Department, the opportunity occurred of placing Wiltshear in charge of the Library, I gladly availed myself of it, and thus, though through no merit of my own, became entitled to the gratitude of all subsequent workers in the Department. The help which Wiltshear was always able and willing to give them was rendered the more acceptable by his modest and pleasant manner, as well as by his intimate knowledge of the position of the volumes; it was usually sufficient to name a book, and he would produce it without referring to the catalogue. He had also the gift of accuracy in a marked degree, whether in making extracts, verifying references, or compiling catalogues—in a word, he was in every respect thoroughly to be depended on.

In the course of his work, Wiltshear came across various points of bibliographical interest; his contributions (in the volumes for 1909, 1912–14) to the "Bibliographical Notes" which have for many years formed a feature of this Journal afford evidence of the care and thoroughness which characterized his investigations. These however by no means represent his minute and exact knowledge, evidence of which is present in the books of the Library in the form of added dates and references, verbal corrections, or items of information, and in the notes found among his papers, which gave promise of future interesting communications. For such particulars Mr. Boulger and myself were frequently indebted to him in the preparation of the new edition of our *Biographical Index*, and we had confidently looked forward to his help in correcting the proofs.

When the War broke out, Wiltshear went into military training, and in June, 1916, joined the forces as a private in the King's Royal Rifles. At the end of that year he was invalided home with "trench foot," and in hospital was delighted to meet with a fellow soldier who was interested in Botany, and with whom he went through the *Journal* for 1916, which I sent him at Christmas. When he had recovered, he went back to France, keeping up by correspondence his connection with the Department. Then came the news that he had "died of wounds" in France, on the 23rd of last November.

Wiltshear was married in 1909 and left one son; I hope before long to publish a genus named in his honour by an officer of the Department with which his name will long be associated.

JAMES BRITTEN.

BIBLIOGRAPHICAL NOTES.

LXXI. TOURNEFORT'S "TOPOGRAPHIE BOTANIQUE."

IN the course of my work on the Sloane Herbarium, I had occasion, in connection with Tournefort's plants preserved therein, to refer to a MS.—no. 82 of the Banksian library and now in the Department of Botany—which is described on its titlepage as "Catalogue des Plantes que Mons^r^ Pitton de Tournefort trouva dans ses Voyages d'Espagne et Portugal copié de l'original dud^t^ Tournefort": the title appears in Dryander's Catalogue of the library (iii. 145). On referring to the MS. again, I found that the late F. G. Wiltshear had collated it with information published in various places concerning the "original" and had added references to these which, taken in connection with the Banksian MS., seem to present features of sufficient interest to be worthy of note.

In *Botanisches Centralblatt* for 1882 (x. 145) is an article headed "Découverte à Toulouse d'un précieux ouvrage manuscrit de Pitton de Tournefort" in which is described, as an autograph work of Tournefort, a small volume of 414 pages, then in the possession of M. C. Roumeguère of Toulon. The work, entitled "Topographie Botanique," had been known to Lapeyrouse, who (see his Hist. abr. Pl. Pyrenées, p. xxiii: 1813) had acquired it at the death of Lémonnier, in whose possession it had been, and gives (pp. xxxix–lvi and suppl. pp. 1, 2) a list of the Pyrenean plants contained in it: after this date the volume seems to have been lost sight of until it was discovered at Toulon.

The writer in the *Centralblatt* rightly states that the volume had been arranged for publication by [Louis] Reneaulme, and refers to the *Mémoires de l'Académie Française* for 1790 as containing "le plan de cette enterprise." It is to be feared however—or perhaps hoped, for the omission would explain what otherwise seems inexplicable—that the *Mémoires* were not consulted, as from them it is evident that the plan (which, although that of Reneaume, is explained by M. Terrasson, Reneaume himself not being concerned in its production before the Académie) was to compile a volume from four of the twelve MSS. of Tournefort to which the title "Topographia Botanica cum notis, &c." would be applied. This title, as indeed is obvious to anyone consulting the *Mémoires*, is in no sense attributable to Tournefort, and, as M. E. Bonnet (Comptes-rendus Assoc. Française, xvi. 557: 1887) remarks, "n'a jamais existé que dans le projet de Reneaume." "S'il est facheux," adds M. Bonnet, "que le Projet présenté à l'Académie n'ait jamais été mis à exécution, il est encore plus regrettable que quelqu'uns des manuscrits confiés à Reneaume, notamment la Nomenclature des plantes des Pyrénées et d'Espagne aient été égarés; de ce dernier du moins, le Muséum [d'Histoire Naturelle] possède, à défaut de l'original, une copie littérale faite par Antoine de Jussieu sur le manuscrit de Tournefort."

The volume subsequently passed into the hands of Dr. Henriques of the University of Coimbra, where it now reposes, who publishes a detailed account of it and of its contents in the *Boletim da Sociedade Broteriana*, viii. 191–247, reprinting that portion which relates to Tournefort's collections in Portugal. This is headed "Denombrement des Plantes que iay trouvé en Portugal en 1689": the first portion (pp. 195–206) corresponds with pp. 159–181 of the Banksian MS., which have a similar title, "M^r. Tournefort a" being substituted for "iay." The MS. copy is thus incomplete; the arrangement of the paper however suggests that its completion was intended.

With regard to the Banksian MS., M. Bonnet (*l. c.*) takes exception to the statement in the *Centralblatt* that the *Topographie Botanique* "était possédé par Banks avant d'échoir à Lemonnier," for which indeed there seems to be no shadow of foundation; but himself falls into a curious error by saying "Aucun manuscrit de Tournefort ne figure sur la *Catalogue de la Bibliothèque de Banks*: as already stated, the MS. is duly entered in the Catalogue (iii. 145). M. Bonnet has himself seen the copy made by A. de Jussieu, which is preserved in the Paris Museum, on the existence of which the *Centralblatt* throws doubt. The Jussieuan copy is described as a quarto of 145 pages: the Banksian is a small quarto of 181 pages, in an elegant hand which appears to me to be Spanish. The entries extend to 2784 numbers, these having been added by Wiltshear for the purpose of collation with the printed portions: the names of course bear no relation to the number of species, of which a separate list is given under each locality. The places of growth are fully specified, as is shown in the extracts given by Lapeyrouse for the Pyrenean plants (nos. 1–417 of the MS.) and by Prof. Henriques for Portugal (nos. 2396–2748). The numbers between 417 and 2396 do not seem to have been published; they relate to Spanish plants other than Pyrenean.

As the MS. is so little known, it may be worth while to describe it somewhat in detail. It is divided into three distinct portions, and consists of four parts, the first of which (pp. 1–51) is headed: "Denombrement des Plantes que Mons. Tournefort a trouvées en Catalogne"; this is followed by the sub-heading quoted by Lapeyrouse (*l. c.*) "Dans le Roussillon autour de Perpignan," which relates only to nos. 1–58; the Pyrenean plants enumerated by Lapeyrouse extend, as has been said, to n. 417, after which come lists of plants found about Barcelona and in places visited thence. On pp. 31–43 is a detailed description of the botany of Montserrat, beginning with the ascent and including the various parts of the range; the introductory paragraph may be quoted:—

"Septem leucis à Barcinone, quæ caput est Cataloniæ occurrit Pulcherrimus Mons ab incolis Serratus appellatus; eó quod, ut aiunt, ejus, cacumen dividatur in apices excelsos acutos, qui serrarum dentes quodam modo referant. Copiosé in ipso nascuntur rariores plantæ, etiam enorum [errorum] quam Botanicorum peregrinantibus magis celebretur; nonnullas ex his descripsit olim Franciscus Myconi [Myconus] Ausoniensis [de Vic] Medicus, qui Barcinone degebat ante pluros annos, quas hodié plane ignoramus [ignoraremus] nisi ad Jacobum Dalecampium [egregius ille vir] eas perhumanè misisset."

The name "Myconi" is in another hand: the reference is to Francisco Micó (b. 1528) about whom a note may be forthcoming later. Linnæus (Sp. Pl. 179) named in his honour *Verbascum myconi* which Lapeyrouse (*op. cit.* 115) raised to the rank of a genus as *Myconia*, on the ground that it "ne peut pas rester parmi les *Verbascum*, où Linnoeus [*sic*] l'a placée," adding "Il est juste que le genre qu'elle doit former porte le nom du Botaniste qui l'a trouvée le premier." This appropriate dedication was unfortunately forestalled by the creation of *Miconia* by Ruiz and Pavon (Prodr. p. 60: 1794): the occurrence is all the more regrettable in that Ramond (after whom the genus was subsequently named) was, according to Lapeyrouse (*op. cit.* xxxiii.) by no means deserving of the honour. The passage copied above from the MS. is of interest as showing that the Banksian transcription cannot be accepted as textually accurate in detail: Lapeyrouse (*l. c.*) also transcribes the passage (in part) from the *Topographie*, and I have placed in brackets the differences which exist between this and the Banksian MS.

The second section of the MS. (pp. 53–63), which is separated from the preceding by a blank page, is headed "Denombrement des plantes que j'ay trouvées de Barcelonne a Valeñce et dans ce Royaume dans les mois d'Aoum [automne] 7^{bre} et 8^{bre}." Neither in this nor the preceding list is the year mentioned, but Lapeyrouse gives 1780—which according to Colmeiro should be 1781—for the first part, and this may be accepted as correct.

The third section (pp. 64–151) is headed "Denombrement des Plantes que Mons. Tournefort a trouvées en Espagne et Portugal au voyage enterpris au mois d'8^{bre} 1688 par l'ordre de Monsieur de Louvois." The principal lists are those from Granada, Cadiz (Gades), and Gibraltar; the plants collected "in monte Calpe" (pp. 104–109) are in part identified and enumerated by Major Wolley-Dod in his *Flora of Gibraltar* (Journ. Bot. 1914, Suppl. iv.)

The fourth section is that already referred to as having been printed in Bol. Soc. Brot. viii. 191–247: here also are slight differences between the text and the MS.

So far as I am aware, none of the second or third sections has been published; the only printed reference to the latter is that cited above for the Gibraltar species.

The Sloane Herbarium contains (H. S. 7, ff. 3–8) Spanish plants from Tournefort, with labels in his hand, which I think belong to his 1681 expedition: others from Spain and Portugal, similarly labelled, are in H. S. 80, 116–125. Others are in Petiver's "Hortus Siccus Hispaniæ" (H. S. 166) and in H. S. 143 and 144, in all of which the plants of Jaime Salvador (1649–1740), who accompanied Tournefort on his journeys, are largely represented; an account of their relations will be found in Colmeiro's admirable *La Botanica de la Peninsula Hispano-Lusitana*, p. 159 (1858), in which (p. 68) is also a reference to the Banksian MS. Numerous letters from Tournefort to Sloane, ranging in date from 1685 to 1704 are in the Sloane MSS. (see *Index* to these. p. 44).

James Britten.

SHORT NOTE.

Foliage of Pulmonaria. In his excellent paper on "British Pulmonarias" (Journ. Bot. 1917), Mr. Willmott remarks, *à propos* of *P. longifolia* Bast. (*P. angustifolia* auct. angl., non L.) that "the spotting is much more variable than Kerner would lead us to suppose" (p. 237). Last year Miss Jekyll kindly sent me a root of her *P. azurea* Besser (*P. angustifolia* L., *sensu stricto*), which is clearly distinct from our New Forest plant. This is now (March 13) in flower; and I was surprised to see that the early leaves are (as a rule) evidently, though faintly, spotted. The Suffolk *P. obscura* Dumort. (*P. officinalis*, var. *immaculata* Opiz) is normally unspotted; but Dr. Hind wrote that a form with faintly blotched foliage might occasionally be found. It thus appears, as might be expected, that in several species the normal character is by no means always constant. I remember that the later root-leaves of the Burgate Wood *P. obscura* differed appreciably from those of ordinary *P. angustifolia*; but unfortunately, though I grew this for over ten years, I failed to dry any of them. It grows in one or two other neighbouring copses or woods, and is (I believe) a true native. A natural hybrid with *P. longifolia* occurred in my garden at Milford, Surrey.—Edward S. Marshall.

REVIEWS.

Flora Melitensis Nova. By S. Sommier and A. Caruana Galto. Firenze, Stabilimento Pellas. 1915.

Although appearing somewhat late, the interest attaching to this excellent Flora of Malta seems to justify some account of it being given, especially as few copies appear to have reached England.

It is well got up, printed in clear large type, singularly free from typographical errors, and full of the most interesting information about the plants recorded. The only criticism I feel inclined to make is that it is a pity a map was not included. Possibly a little too much tenderness has been shown to the older Maltese botanists by not excluding records which were evidently erroneous—*e. g. Trifolium spumosum*, stated by Gulia to be "very common," but which has never since been found. All species, however, which have not been seen by the authors themselves are marked with an asterisk. The history of Maltese botany is fully treated, and a table, which should prove of interest to students of geographical distribution, shows not only the distribution of species in the various Maltese islands, but also in Sicily, Northern Africa, and the East. The book is published in Italian.

Those who have only seen Malta in the summer would find it hard to believe that any indigenous vegetation could be found there at all, except, perhaps, xerophilous plants. At that time of the year there are only two colours in the landscape—the intense blue of the sea and sky, and the dazzling white of the rocks, field-walls, buildings and roads. There are no rivers, or even true perennial water-courses, no mountains, lakes, or considerable marshes, no woods or plantations, so that most of the vegetation peculiar to these stations is absent. Geologically the islands consist almost entirely of coralline and globigerina limestone, so that there is very little variety of soil. The density of the population is extraordinary—2167 to the square mile in Malta, 879 in Gozo. The total area is only 75,000 acres (the Isle of Wight has 100,000), and of this 41,865 acres are under cultivation. The rest is occupied by buildings, or is uncultivated land, mostly rocky ground, wind-swept, denuded, and arid, with only scattered pockets of soil, generally only a few centimetres deep. Yet in spite of all these restrictions the flora is remarkably rich for so limited a space. No fewer than 913 species (including ferns), 78 mosses, 183 lichens, 296 Algæ and 499 Fungi are recorded.

Perhaps the most interesting plant referred to is *Melitella*, a new genus of *Cichoriaceæ*, which was discovered in 1906 by Sommier in Gozo, and afterwards at Malta. Of this an excellent plate and description are given. *M. pusilla*, the only species, is a dwarf stemless plant with a rosette of leaves adpressed to the ground, surrounding what appears to be a sessile single capitulum, but which really consists of from two to eight flower-heads. It has since been found in Cyrenaica.

Another interesting plant is *Oxalis cernua*, a trimorphic species from the Cape of Good Hope, of which only the short-styled form grows in Malta. It was first mentioned by Giacinto in 1806 in a list of plants in the Malta Botanical Gardens. To such an extent has it spread that the fields are yellow with it, as fields at home sometimes are with charlock, and it is found everywhere—on the walls, by the roadsides, and in such abundance that it far exceeds all the other flowers together. The extraordinary thing is that all this immense profusion of flowers results in no production of capsules, the other forms capable of fertilising the ovary being absent. The authors of the *Flora*, one of whom has lived in Malta all his life, state that they have never seen it in fruit. It appears, however, that recently it has been found at Naples and Palermo with mature seeds, and it has been suggested that possibly after its long isolation, it has acquired the faculty of being fertilised by pollen of the same form. This has not occurred at Malta, where it has been much longer established, and it would seem more probable that one of the other forms may have been cultivated in gardens at Naples and Palermo, or that it may have been fertilised from some other garden species. A form with double flowers is very abundant in Malta and Lampedusa, which furnishes a confirmation of Darwin's theory that sterility is the exciting cause of double flowers. It is curious that such an immense amount of energy should be wasted in the production of useless flowers. One would have thought they would tend to disappear when the method of propagation became purely vegetative, *i.e.* by the bulbils on the roots.

Another plant which greatly interested me when I was in Malta has been described as a new species by the authors—*Anacamptis Urvilleana.* It is shorter and more slender than *A. pyramidalis* with an ovate never conical spike, of pale rose-coloured flowers, which opens its first flowers as early as February, whereas *pyramidalis* does not begin to flower till April in Malta. One day in the Üied Encita I saw a small bee settled on a spike of *Urvilleana.* I watched it for some time, but as it did not move, I touched it, and found it was dead. I then removed it, and found to my astonishment that it was held in position by a pink spider, of exactly the same hue as the flowers, which, alarmed at my interference, released it and retreated amongst the flowers. If my memory serves me right, I found a dead bee on this plant on more than one occasion. This would seem to indicate, though not to prove, that this species is sometimes fertilised by bees. If this is the case it would explain Sommier and Galto's statement that though *pyramidalis* and *Urvilleana* sometimes grow together, no intermediate forms or hybrids have ever been found: for if the former is fertilised by Hymenoptera, hybrids would not be likely to occur. Otherwise it might be expected, from the facility with which species of the same genus of *Orchidaceæ* hybridise on the shores of the Mediterranean, that two such nearly allied species would occasionally cross, in those stations where they grow together.

The very remarkable *Ophrys speculum* is rare in Malta, but not in Gozo. In 1872 J. F. Duthie noticed only a few specimens in the latter island, but two years later he found it common along the whole coast: see his interesting account of "The Botany of the Maltese Islands in 1874," published in this Journal for that year, pp. 321–326; 1875, pp. 36–42. *Orchis saccata* is recorded as being occasionally found with white flowers. *Ophrys bombyliflora* is not rare in Malta, where it grows in dry places; on the Continent it is generally found in moist ground.

M. J. Godfery.

The Exploitation of Plants. By various writers, edited by F. W. Oliver, F.R.S. J. M. Dent & Sons, Ltd. (Imperial Studies Series). Pp. 170, 8vo. 2*s.* 6*d.* net.

Before the War, ecology was all the rage: now, with a slight change of affix but a world of meaning, economy is in everybody's mouth. In last year's Journal (p. 196) was reviewed an excellent series of essays by members of the University of Cambridge, edited by the Master of Downing; and here the University of London follows suit with a set of lectures under the editorship of the Quain Professor of Botany. The word "exploitation" is ugly, suggesting some wicked and unscrupulous misuse rather than the meritorious utilization intended; but this title and the absence of an index are almost the only faults we have to find with a volume which is both opportune and well executed. The very variety of the topics dealt with makes us wish for an index for future reference, while the most striking feature of the whole work is, perhaps, that nine botanists, most of whom have been hitherto known only as devotees of pure science, should have thrown themselves so completely into an economic *rôle.* Dr. Willis, indeed, has to pull himself up at the close of a dissertation on Brazil's difficulty in finding and feeding labourers for her rubber forests with the remark that "this is a scientific course of lectures"—by which he means a course of lectures on science.

The critical botanist will be gratified to find that Prof. Oliver in his Introduction, after alluding to Dr. Rendle's stimulating Address at Newcastle, and to the colonial Floras planned by Sir William Hooker—which, by the way, are singularly destitute of economic information—, remarks: "Very slight specific or varietal differences between allied plants are often of critical significance in matters of exploitation, and it is of fundamental importance, when a given plant is found to be adapted to a particular purpose, that we should know how to recognise it with certainty."

Prof. Bottomley adds but little to what he has repeatedly published as to bacterised peat, and when he refers to the loss to the suburban gardener of the manure of 50,000 horses he cannot be supposed to suggest this as a substitute in mushroom-growing. The editor contributes an interesting lecture on waste lands, referring to Dr. Edwards's reclamation work at Methwold, that of the Midland Reafforesting Association and the dune planting in Gascony and at Holkham, and suggesting that we might emulate the Dutch bulb-growing and may utilize *Spartina Townsendii* as a paper-material. We are glad to see that he finds room to denounce the rabbit as the bane of the tree planter, as also does Dr. Salisbury in the succeeding lecture on Timber Production. As might be expected, this lecture demonstrates the value of ecological study in afforestation—*e. g.* in discriminating between the soil-requirements of *Quercus Robur* and *Q. sessiliflora*; but in speaking of Ash as a profitable crop the lecturer should, we think, have said more as to its somewhat exacting demands than is suggested by the one word "calcareous."

It is significant that, of the nine lecturers, three are women, the learned sketch of Vegetable Dyes by Dr. Sarah Baker being her last work. Dr. Ethel Thomas, in speaking of "the Plant as Healer."

gives us more historical lore than the other lecturers and ends with a suggestion from Mr. Bateson that scent-bearing and non-scent-bearing may prove to be Mendelian characters. Dr. Marie Stopes says that "we swallow coal products, wear coal products, scent ourselves with coal products, nourish our flowers and crops with coal products, destroy our enemies with coal products," and her lecture, as may be imagined, is by no means the least interesting of the series to the general reader; for just at present, when we find it difficult to get even a modicum of tea of any kind, Dr. Chandler's clear exposition of the real value of good tea reads too much like a counsel of perfection.

G. S. BOULGER.

A Monograph of the Calamites of Western Europe. By Dr. R. KIDSTON & Dr. W. J. JONGMANS (Vol. vii. of the Memoirs of the Government Institute for the Geological Exploration of the Netherlands). Text, Part I. Atlas: Plates 1–158. Text 15 guilders, Atlas 45 guilders. M. Nijhoff, The Hague, 1917.

DR. JONGMANS is a most indefatigable worker who has already earned the gratitude of palæobotanists by his bibliographical publications which, in spite of the enormous labour entailed, have not absorbed the whole of his scientific energy. The present volume is the first fruits of the joint work of Dr. Kidston and Dr. Jongmans on the *Calamites*: it contains the results of their exhaustive and critical survey of all the known species of the genus *Calamites*, and is an authoritative systematic analysis which will be of very great value for palæo-botanists. The Atlas consists of excellent collotype reproductions of impressions of pith-casts and, in several instances, of stems showing the external features. The reproduction of many type-specimens and the large amount of first-hand information about the material passed under review give exceptional value to the Monograph.

It is unfortunate that foliage-shoots and cones are seldom found in organic connexion with pith-casts, but by piecing together evidence from different sources it is possible to obtain an accurate picture of the habit of some of the Equisetaceous trees of the Coal period forests. The surface of the trunk of a Calamite, as Williamson concluded from his anatomical researches, was smooth and not ribbed, though often longitudinally cracked or transversely wrinkled. It is probable that the foliage-shoots were cut off by a basal absciss-layer like the branches of *Agathis* and some existing dicotyledonous trees. Whorls of narrow lanceolate leaves are occasionally preserved on impressions of fairly robust aerial shoots, and in some species they are united into a continuous nodal sheath. A pith-cast of *Calamites gigas* Brongn., 20 cm. in diameter, affords striking evidence of the large girth of some of the Calamitean stems. A species of a different type is represented by *Calamites jubatus* (L. & H.), which apparently had comparatively little secondary wood and more closely resembled the modern herbaceous Equisetums. A few specimens are described in which the ribs and grooves are by no means always alternate on each side of a node. In *Calamites taitianus* K. & J., a new species, the ribs are sometimes continuous from one internode to the next, and in some examples of *C. approximatiformis* Stur, the ribs and grooves are always continuous, a feature usually regarded as peculiar to *Archæocalamites*. It is interesting to find that the species in which the regular alternation has lost its constancy are intermediate in age between the typical species of *Calamites* and the older *Archæocalamites*.

The description of each species is accompanied by a synonymy based on an examination of type-specimens, and a summary of the geographical and geological range—a most welcome contribution to a much neglected branch of systematic palæobotany.

Great credit is due both to the department of the Netherlands Government responsible for the publication of this splendid monograph and to the authors for their successful completion of the most difficult part of their task.

A General Introduction is promised after the War, and this, one hopes, will deal not only with impressions but with anatomical features, so far at least as they can be correlated with the pith-casts and surface-characters. The production of a monograph on the scale of this volume is only possible with the assistance of a substantial subsidy, and the enlightened action of the Dutch Government affords a striking contrast to the parsimony and lack of appreciation of the value of scientific research characteristic of our own Government departments.

A. C. Seward.

BOOK-NOTES, NEWS, ETC.

The recent publication of *The Book of the Peony* by Mr. Edward Harding (Lippincott) suggests that it may be worth while to call attention to the series of thirteen original drawings of cultivated Peonies by Clara Maria Pope, now in the Department of Botany. These formerly belonged to the Horticultural Society, and were disposed of at its sale, May 2–5, 1856: each bears the artist's autograph and date of execution (1821–2). The sheets are of double atlas size; when acquired they were in a portfolio, but have since been bound. Mrs. Pope also illustrated Samuel Curtis's *Monograph of Camellia* (1819), and there can be little doubt that the two plates of Dahlias in his *Beauties of Flora* (1820)—as to which see Journ. Bot. 1899, 183—are her work, although they are not signed. The drawings of Peonies—and indeed the published plates—are admirably executed in the bold style suited to their subjects: according to the *Dictionary of National Biography* (xlvi. 130) Mrs. Pope "enjoyed during the latter part of her life a great reputation for groups of flowers, of which she was an annual exhibitor from 1816 till her death" on Dec. 24, 1838. Although her work was thus on a large scale (for the illustrations we have mentioned consist of groups) she occasionally did smaller figures—*e. g.* what is rightly styled in the text "the beautiful drawing of *Tropæolum majus* (Bot. Mag. 1835, t. 3375), where by inadvertence she is styled *Miss* Pope: the figure of *Colletia horrida* (*op. cit.* 1838, t. 3644) is attributed to her in the text, but the plate is signed "W. Fitch del^t." Mrs. Pope was at one time officially connected with the Horticultural Society as "flower-painter"; the sale catalogue already mentioned includes "nine large drawings of Dahlias," and her name also appears in a collection of "miscellaneous drawings." Two portraits of Mrs. Pope, painted by her first husband (Francis Wheatley "to whom she served as model for all his prettiest fancy figures"), were engraved by Stanier and Bartolozzi" (Dict. Nat. Biogr.).

The recently issued part (vol. vi. sect. 2, part 2) of the *Flora of Tropical Africa* contains the conclusion of the *Moraceæ* by Mr. J. Hutchinson and Dr. Rendle: the *Urticaceæ*, occupying the larger portion of the part, by Dr. Rendle; *Myricaceæ* by Mr. Hutchinson; *Salicineæ* and *Ceratophylleæ* by Mr. S. A. Skan: *Gnetaceæ* by the late H. H. W. Pearson; *Pinaceæ* and *Taxaceæ* by Dr. Stapf; and *Cycadaceæ* by the editor, Sir David Prain, who contributes an interesting preface. In view of the difficulties as to dates with which botanists are only too familiar, it might be well to ascertain exactly when the part was actually issued; the "dates of publication of the several [*i. e.* two] parts of this volume" printed on the back of the title-page give this as November, 1917, but it was not received at the Department of Botany until Feb. 23 of the present year. Numerous new species are described: in view of the rule which insists on a Latin diagnosis as a condition of recognized publication, how will these be regarded by future monographers? We note that while the former temporary Kew practice of spelling specific names derived from persons with a small initial has been abandoned when the name is in the genitive case, it is maintained when this is given in adjective form—*e. g.* "carruthersiana."

The *Kew Bulletin* for November last contains a "List of Economic Plants native or suitable for Cultivation in the British Empire," with an introduction by Dr. Rendle. The title is, we think, somewhat misleading, as food plants are excluded. The *Bulletin* for December includes an interesting "Flora of the Somme Battlefield," by Captain A. W. Hill. In the first number for 1918, dated February, Miss Ida M. Roper gives an account of the experiment now being tried in North Somerset to counteract the constant erosion of the coast line by the planting of *Spartina Townsendi*. Other papers in the number, which contains 48 pages, 4 plates, and other illustrations, and costs only 5*d.*—happy is an editor who has a Government Department at his back!—are on *Pinus canariensis* by J. Hutchinson, who also contributes descriptions of the Canarian species of *Cytisus* (many of them new) known as fodder plants under the names "Tagasaste" and "Garcia"; on the diseases of Parsnips by A. D. Cotton; and on the genus *Rhizophora* in British Guiana, by Alleyne Leechman, who describes a new species, *R. Harrisonii*.

The *Annals of Botany* for January contains the seventh instalment, dealing with the *Pteroideæ*, of Prof. Bower's "Studies in the Phylogeny of the Filicales"; "Studies in the Permeability of the Pulvinus of *Mimosa pudica*," by V. H. Blackman and S. G. Paine;

"Further Notes on Intrafascicular Cambium in Monocotyledons," by Mr. Arber; "Chondriosomes and the Primordia of Chloroplasts and Leucoplasts," by D. M. Mottier; "Morphology and Cytology of Sexual Organs of *Phytophthora erythroseptica*," by P. A. Murphy; "The Development of *Thaustotheca*, a Peculiar Water-Mould," by W. H. Weston; and a note "On a Peculiarity exhibited by the Testa of Wrinkled Peas," by S. G. Paine and L. M. Saunders.

The *Essex Naturalist*, published in February (xviii. parts 10, 11) contains a very interesting "Short History of the Study of Mycetozoa in Britain, with a List of Species collected in Essex"—a Presidential Address by Miss Gulielma Lister; Mr. Joseph Ross gives a list of the species found in the Chingford district of Epping Forest, and an account of the discovery in the Forest of *Ptilidium pulcherrimum*.

The Rev. H. J. Riddelsdell sends us a list of Gloucestershire *Rubi* (reprinted from the Proceedings of the Cotteswold Field-Club) which "forms a first and typical instalment of the Preliminary List of Gloucestershire Plants," which however is "not the ideal on which the completed County Flora will be framed." It will be remembered that Mr. Boulger's "Notes preliminary to the proposed Flora" were published forty years ago, so that the progress of the work has not been rapid: we hope Mr. Riddelsdell will bring it to a satisfactory conclusion.

At the meeting of the Linnean Society on Feb. 21, a paper was read by Mr. W. B. Brierley entitled "Experimental Studies on the Specific Value of Morphological Characters in the Fungi."

In the *Bulletin de la Société de Pathologie Exotique* for 1917, Chalmers and Pekkola have given an account of cutaneous eruption (dermatitis venenata) caused by *Haplophyllum tuberculatum* Forsk. in the Sudan. The susceptible person about thirty hours after he began working in the Rue was troubled with marked irritation on his hands, feet, and legs. Eruptions began as small red papules which increased in size until neighbouring ones coalesced and formed large red swollen areas; then his hands and legs swelled and were red and itching; there was also headache, and pain in the epigastric region and other clinical symptoms. When the patient left off working amongst the *Haplophyllum* he immediately felt easier and gradually got well without any treatment. The earlier symptoms were afterwards produced in the same person by rubbing his arm with leaves and flowers of the plant for a few seconds.—J. R.

In the *Journal of Genetics* (February) Mr. A. B. Stout continues his observations on Chicory in a paper entitled "Fertility in *Cichorium Intybus*: Self-Compatibility and Self-Incompatibility among Offspring of self-fertile lines of descent"; Mr. W. O. Backhouse, Economic Botanist to the Argentine Government, writes of "The Inheritance of Glume Length in *Triticum polonicum*: a Case of Zygotic Inhibition."

Dr. H. O. FORBES'S NEW GUINEA RUBIACEÆ.—II.

By H. F. Wernham, D.Sc., F.L.S.

(Concluded from p. 77.)

The following paper, which includes the three genera *Gouldia*, *Timonius*, and *Psychotria*, concludes our account of Dr. Forbes's New Guinea Rubiaceæ:—

Gouldia. All the previously-known species of this genus are confined to the Sandwich Islands; the following, from the Sogere region, is therefore of especial interest. Our specimen unfortunately bears fruit only, and no flowers; but the habit and the fruit-structure leave no doubt that it should be assigned to this genus.

Gouldia papuana, sp. nov.

Arbor (?) ramulis validiusculis novissimis tamen gracilioribus valde complanatis minute necnon dense ferrugineo-pulverulentibus, mox cortice lignoso crasso aspero indutis cinereo. *Folia* firme chartacea lanceolata nonnunquam elliptica utrinque acuminata apice obtusa, supra glabra in siccitate dilute viridia venis impressis, subtus minute præsertim in venis fulvo-pubescentia; *venæ* primariæ utrinque manifestæ, subtus prominulæ, laterales utrinque 9–12; *petiolus* brevis supra canaliculatus glaber, dorso rotunde-convexus fulvo-pulverulens; *stipulæ* crassiusculæ lanceolatæ acuminatæ dorso præsertim basin versus rufo-pubescentes dorsoque tandem carinatæ mox caducæ. *Panicula* axillaris pedunculo rectissimo longo in rachidem minute ferrugineo-puberulam producto, brachiis lateralibus verticillatis rigide necnon recte perpendicularibus, bracteæ post anthesin caducæ. *Baccæ* numerosæ minuscule pisiformes glabræ, in ramulis conspicue adscentibus affixæ sessiles, apice umbonatæ, calyce omnino absente, biloculares, seminibus parvis numerosis.

Sogere. No. 442!

The distinctive features of the species are the long-stalked axillary panicles, the large berries, and the pubescence of the leaves. *Leaves* 10–14 cm. × 3–5 cm.; petiole rarely so much as 9 mm. long; *stipules* 10 mm. × 3 mm. *Peduncle* 3–4 cm. or longer; *panicle* (fruiting), to 6 cm. or longer, and 6 cm. wide at base. *Berry* 5 mm. in diameter.

Timonius. (See Valeton, in Bull. Dep. Agric. Ind. Neder. xxvi. (1909).) Every collection of New Guinea plants reveals species hitherto unknown of this interesting genus. Those gathered recently in Dutch New Guinea, on Mt. Carstenz, which I described in Trans. Linn. Soc. ix. (1916) 73–74, are very quaint in habit, altogether unlike any described before—a phenomenon due largely, without doubt, to the considerable elevations at which they occur. The following, though quite distinct, are more normal in their appearance, and comparable with previously known forms. The genus is abundantly represented in the Indo-Malayan region, where it replaces, to a considerable degree, *Guettarda* of the New World.

Timonius koikokoensis, sp. nov.

Arbor subglabra, novitatibus subglabris ipsis, ramulis gracilibus mox cortice indutis rugosulo. *Folia* firme chartacea, elliptica apice acuminata necnon basi acuta, petiolo breviusculo graciliusculo glabro, lamina supra subnitentia venis impressis tamen manifestis, subtus obsolete hic inde pilosa demum glabrata nisi venarum lateralium (utrinque 6) in axillis barbellata; *stipulæ* lanceolatæ plus minus concaveæ extus versus apicem sericeæ aliter glabræ mox caducæ, pilorum fimbrias rectilineas relinquentes. *Flores* ♀ in axillis solitarii pedicellis longis in gracilibus dispositi tardius plus minus elongatis, *bracteolis* 2 quisque lanceolatis setaceis minimis tamen manifestis onustus. *Calycis* lobi 4 oblongi obtusi minimi. *Corolla* extus densissime flavo-sericea, lobis 4 ovato-lanceolatis obtusis, tubo cylindrico latiusculo. *Ovarium* loculis numerosis. *Fructus* globosus tandem glabratus, calyce coronatus persistente.

Mt. Koikoko, 3000 feet. *Fr.* 23 January. No. 593!

A small tree, with light-green fruits. *Leaves* 7–12 cm. × 2·5–4·5 cm., with petiole up to 1 cm. long. *Stipules* 5 mm. long. *Pedicels* 1–1·5 cm., rather longer in fruiting stages; *bracteoles* 3–4 mm. long under the fruit. *Calyx* 2–3 mm., with *ovary* barely 3 mm. long. *Corolla*-tube 4 mm. long, 2 mm. broad; lobes 2 mm. long. *Fruit* about 7 mm. in diameter. This species is allied to *T. Jambosella* Thw., but is readily distinguished by the calyx-lobes.

Timonius merokensis, sp. nov.

Frutex magnus, ramulis gracillimis in novitate densissime flavo-sericeis, novissimis complanato-sulcatis, cortice demum striato cinereo indutis, senioribus ipsis gracillimis. *Folia* parva firme chartacea anguste elliptica utrinque parum acuminata, apice nonnunquam subobtusa, supra glabra subtus in venis dense aliter sparse appresse pubescentia venarum axillis barbellata; petiolo gracili longiusculo subtus appresse sericeo-pubescente; venis primariis supra debilibus impressis subtus prominentibus, lateralibus utrinque 5–6; *stipulæ* lanceolatæ acuminatissimæ acutissimæ, dorso nonnunquam alte carinatæ, extus hirsutæ. *Flores* ♀ in axillis superioribus solitarii, pedicellis in rectis pro rata longiusculis appresse pubescentibus dispositi; *bracteolæ* lanceolatæ pedicelli in apice insertæ. *Fructus* ellipsoideus aurantiacus extus pulverulo-pubescens majusculus, 4–5 locularis, *calyce* persistente coronatus, tubo cylindrico manifesto, lobis 4 lanceolatis obtusis, intus glabrescentibus, extus sparsiuscule sericeis, tubo duplo longioribus.

Sogere, riverside, 1750 feet. No. 699! Mount Meroka. *Fr.* 5 April. No. 931!

A large shrub, with rich orange-green fruits. *Leaves* 4–6·5 cm. × 1·5–2·3 cm., with stalk up to 1·5 cm. in length. *Stipules* 5 mm. × 1·5 mm., or sometimes the ovate base is as much as 3 mm. broad. *Pedicels* 1·5 cm. long; *bracteoles* 2–3 mm. long. *Fruit* 1·5 cm. long, by 1 cm. or more in transverse diameter; the *calyx*-tube 2 mm. deep, and the lobes 4 mm. long. The 4 or 5 pyrenes are shaped like a "quarter" of an orange; they are relatively quite large—8–9 mm. long and 4 mm. thick—and very hard and horny; but the seed is very small. This species differs from *T. Rumphii* DC., a close ally, especially in the smooth fruit and small terminal stipules.

T. laugerioides, sp. nov.

Nisi in inflorescentiis molliter sericeo-pubescentibus glaberrimus ipsis in novitatibus, ramulis quadrangularibus sæpe valde complanatis validis apice ipso lignosis truncatis, cortice rugosulo cinereo indutis, nodis plus minus tumidis. *Folia* inter majora firme chartacea subcoriacea, elliptica ad obovata apice vix acuminata basi acuta, petiolo validiusculo sæpius brevi supra alte canaliculato subtus carinato-convexo basi in insertione in nodum notabiliter tumido, cicatricem conspicuam suborbicularem demum relinquente; *stipulæ* longæ subcoriaceæ læves necnon nitentes, calyptram acuminatissimam formantes acutissimam oblongo-lanceolatam, alabastrum terminalem includentem, mox utrinque fissam. *Flores* ♂ pentameri in cymas axillares dispositi bifurcatas subsecundi abbreviatas, pedunculis validiusculis brevibus; *bracteæ* parvæ tamen manifestæ plus minus persistentes ovatæ concaveæ subscaphoideæ acuminatæ; flores sessiles quisque necnon in pulvino conspicuo densissime pubescente lateraliter in rachide affixus. *Calyx* campanulatus dense fulvo-sericeus, dentibus late triangularibus. *Corolla* (apertam non vidi) gracilis subelongata parum sub lobos dilatata. *Flores* ♀ similiter dispositi, cymæ modo breviores floribus paucioribus, alabastra quoque pinguiora; *calyx* dentibus brevibus latissimis persistens. *Fructus* globosus extus tuberculatus necnon sensim sulcato-striatus, dense minute fulvo-pubescens; pyrenæ numerosissimæ radiatim e centro quoquoversus dispositæ.

Sogere, 2000 feet. Flowers (♂) in bud cream-white, 7 January. No. 386! Flowers (♀) in bud and fruits. No. 819!

This species is allied to *T. novo-guineensis* Warb., but is readily distinguished by the characters of the growing apices, the stipules, and the fruit, as well as the texture and venation of the *leaves*. The latter are from 11 cm. × 4 cm. to 18 cm. × 8 cm. in the male plant, and rather larger in the female; petiole rarely as much as 1·5 cm. long. The principal veins are impressed but manifest on the upper surface of the leaf, prominent below; lateral pairs, 10–12; *stipules*, 2 cm. or longer, 3–5 mm. broad. *Peduncle* 4 mm. to over 1 cm. in length; branches 1·5 cm. or longer. *Fruit* barely 1 cm. in diameter.

I take the present opportunity to describe the following new species, collected by Barclay in the Island of Jobie, in Geelvink Bay, in the north coast of (Dutch) New Guinea:—

T. jobiensis, sp. nov.

Frutex ramulis validiusculis novissimis dense necnon minute appresse griseo-pubescentibus, mox glaberrimis, cortice subargenteo-griseo indutis, brevissime subalatis vel notissime striatis, primo valde complanatis, tandem obtuse subcomplanatis. *Folia* coriacea glaberrima ampla late obovato-orbicularia basi subauriculato-cordata, petiolo valido necnon brevissimo nonnunquam obsoleto; *venæ* primariæ supra canaliculato-impressæ subtus prominulæ, laterales utrinque 7–8; *stipulæ* crasse coriaceæ; lanceolatæ acute acuminatæ, dorso validissime carinatæ, ramulo manifeste angustiores, appresse griseo-pubescentes, ad nodos articulatæ, mox caducæ vaginam chartaceam relinquentes latam brevissimam, margine pilis brevissimis superiore fimbriato. *Flores* ♀ sessiles in cyma bis dichotoma secundi dispositi pauciflora, pedunculo foliis multo breviore. *Calycis* dentes breves crassi acutissimi anguste triangulares brevissimi tardius patentes. *Fructus* multilocularis, loculis radiatim dispositis, globosus, calyce persistente coronatus brevissime 5–6-dentato, lævis necnon minute primo dense tandem sparsiuscule appresse pulverulento-pubescens.

In the forest, Island of Jobie, *Barclay* 3594!

A shrub 8 feet high, readily distinguished by the shape of the *leaves*, 9–16 cm. × 5–11 cm., which recall those of *Guettarda speciosa*, and the smooth surface of the multilocular fruit. *Stipules* 6 mm. × 3 mm. Peduncle of *inflorescence* rarely exceeding 3 mm. *Fruit* 8 to 9 mm. in diameter.

PSYCHOTRIA is by far the most widely and abundantly (in number of species) represented genus of Rubiaceæ in the tropics. Most of the species are shrubs, occurring in the undergrowth of the dense tropical forest. In most cases only two seeds are produced in the berry; these are relatively large, and lacking in any special mechanism for dispersal; as a consequence, the area of distribution of each species is in most cases very limited. Nearly 50 species have been described already for New Guinea.

P. beccarioides, sp. nov.

Arbor minusculus nisi floribus ipsis in novitatibus glaberrimus ramis lævibus minute striatis teretibus, ramulis valde sulcato-complanatis. *Folia* magna firme pergamacea elliptico-oblonga apice vix acuminata potius late subacute mucronata, supra nitentia utrinque glaberrima, venæ cum rete præsertim subtus conspicuæ, primariæ laterales utrinque ca. 9 intramarginaliter curvatim anastomosantes; *petiolus* longus gracilis; *stipulæ* subcoriaceæ longiuscule oblongæ acuminatæ mox caducæ. *Flores* inter minores in cyma ebracteata abbreviata sessili dispositi laxa, ramulis validiusculis, pedicellis conspicuis nec gracilibus. *Calyx* depresse infundibularis limbo truncato; *corollæ* tubus pinguiuscule cylindricus brevis, lobi ovati breves valde reflexi. *Stamina* 5 antheris vix ad medium exsertis; *stigmata* 2 folioso-complanata exserta.

Sogere, 3000 feet. *Fl.* 30 October. No. 316!

A small tree, with pale flesh-coloured corollas and light red calyces. *Leaves* about 23 cm. × 9 cm., with stalks as much as 4 cm. in length; *stipules* nearly 1·5 cm. long. *Cyme* roughly globular, 4 cm. in diameter. *Calyx*, with ovary, 2 mm. long; *corolla*-tube 3 mm. long and over 2 mm. broad, lobes 1 mm.

Nearly allied to *P. Beccarii* K. Sch., but distinguished by the much shorter and relatively stouter corolla, the stout inflorescence-branches and pedicels, and the exserted leafy stigmas.

P. BECCARII K. Schum. *Hydnophytum Beccarii* K. Schum. in Engl. Bot. Jahrb. ix. (1887) 221. Nn. 176, 199, of the present collection correspond with the description of this species, and also with *Lauterbach* 114! distributed from the Berlin herbarium under the same name. According to Forbes, this is a large tree, about 40 feet high; the flowers are pale cream-colour with light-red calyces. He collected his specimens in the neighbourhood of Mt. Sogere, flowering 22 October, at 2500 feet.

P. gawadacephaelis, sp. nov.

Arbor modicus ramulis gracilibus, in novitate dense rufo-villoso-pubescentibus, tardiuscule glabrescentibus, teretibus junioribus valde complanatis. *Folia* firme chartacea inter minora plerumque lanceolata utrinque longiuscule acuminata apice obtusa, supra glabra venis impressis tamen manifestis, subtus præsertim in venis prominentibus intra marginem lateralibus (utrinque ca. 12–14) curvatim anastomosantibus sparsiuscule rufo-pilosa, *petiolo* brevi qua venæ densius modo induto graciliusculo; *stipulæ* crassiusculæ lanceolatæ acuminatæ acutissimæ basi semi-amplexicaules dorso dense rufo-villosæ, intus glabratæ, mox caducæ. *Flores* inter majores in capitulis terminalibus arcte sessilibus dispositi candidi sessiles ca. 10-floribus. *Calycis* campanulati limbus obscure sinuato-dentatus, dense rufo-pilosi. *Corollæ* tubus cylindricus longiusculus validiusculus extus nisi basi glabratus dense flavo-villosus, lobi lineari-oblongi subelongati extus simile induti intus glabrati.

Mt. Gawada, 4500 feet. *Fl.* 20 January. No. 513!

A moderate tree, with pure white flowers, apparently allied to *P. conglobata* Val., from which it differs in its tree-habit, sessile inflorescence, stipules, etc. *Leaves* 9–13 cm. × 2·5–4 cm., with stalk rarely more than 1 cm. in length; *stipules* 8 mm. × 3·5 mm. *Calyx*, with ovary, 5·5 mm. long; *corolla*-tube 11–12 mm. long, 3–4 mm. wide, lobes about 1 cm. long.

P. resurrecta, sp. nov.

Frutex majusculus scandens nisi bracteis glaberrimus ipsis in novitatibus, ramis lævibus teretibus striatis gracilibus, ramulis sulcato-complanatis, medulla magna conspicua. *Folia* minuscula subcoriacea elliptica apice breviter subcaudato-acuminata sæpius obtusa, basi acuta, margine revoluta, venis præsertim supra inconspicuis subocclusis, in siccitate valde discoloria—supra præclare dilute viridia subtus fusco-brunnea, utrinque glaberrima; *petiolus* modicus subgracilis; *stipulæ* caducissimæ. *Flores* albi in panicula terminali ampla multiflora dispositi laxa minimi glabri sessiles; *bracteæ* minimæ rotundatæ margine conspicue ciliolatæ. *Calyx* campanulatus limbo conspicuo subtruncato v. obscure dentato. *Corolla* infundibularis glaberrimus lobis 5 oblongis obtusis apice incrassatis reflexis. *Bacca* minima ellipsoidea glabra obtuse costata bilocularis, calyce conspicuo persistente coronata.

Mt. Gawada, 3000 feet. *Fr.* April. No. 869! Mt. Woriwori, 5000 feet. No. 711! 710!

A large climber, characterized by its habit, complete glabrousness, and large terminal panicles of many minute flowers. *Leaves* 6–8 cm. × 2·5–4 cm., petiole not more than 1 cm. long. *Panicle* about 20 cm. long and 15 cm. wide; the primary rachides, 3 arising from the terminal node, are 4 cm. to 6 cm. long. *Calyx*, with ovary, 2–2·5 mm.

Corolla-tube 3 mm., lobes 1 mm. *Berry* lavender-blue (*Forbes*), 3 mm. in the long axis, 2·5 mm. wide, surmounted by the calyx 1 mm. high.

P. (§ Grumilea) cornifer, sp. nov.

Frutex nisi in florum regione glaberrimus ramulis lævissimis striatis junioribus sulcato-complanatis. *Folia* tenue chartacea in siccitate utrinque rufo-brunnea glaberrima, elliptice oblonga utrinque acuminata apice obtusa; *venæ* primariæ prominulæ lateralibus utrinque ca. 12 intra marginem arcuatim anastomosantibus; *petiolus* longus gracilis glaber, basi paullum inflatus; *stipulæ* caducissimæ. *Flores* inter minimos 5-meri in cyma terminali densiflora corymbosa dispositi, ramulis ferrugineo-pubescentibus; *bracteæ* conspicuæ subulato-lanceolatæ valde concaveæ margine nonnunquam ciliolatæ aliter glabratæ, tauri cornuum modo arcuatim adscendentes seniores longiusculæ. *Calyx* infundibularis brevissime necnon acute limbo dentato glaberrimus. *Corolla* (apertam non vidi) extus glabra intus infra medium staminum versus insertionem pilorum candidorum annulo barbatim densissime instructa.

Sogere, 2500 feet. *Fl.* (bud), 20 October. No. 136!

Allied apparently to *Grumilea malacorhax* Laut. & K. Schum., differing in the bracts, the indumentum of the inflorescence, and the calyx-limb. *Leaves* 14–18 cm. × 5·5–6 cm., with stalk 2·5–3 cm. long. *Inflorescence* 5–6 cm. in diameter; *bracts* as much as 1 cm. long. The buds, of a rich cream-yellow (*Forbes*), are about 3 mm. long.

P. (§ Grumilea) Scratchleyi, sp. nov.

Frutex (?) in siccitate præclare rufescens omnino nisi stipulis nonnunquam minute ciliolatis novitatibus ipsis glaberrimus, ramulis gracilibus junioribus valde complanatis sulcatis. *Folia* firme pergamacea oblanceolata v. oblonga apice parum acuminata basi longe cuneata; petiolus gracilis longiusculus; *venæ* primariæ præsertim subtus prominulæ tenues laterales utrinque 12–15, reticulatione interveniente occlusa; *stipulæ* majusculæ triangulares, margine sæpe irregulariter dentatæ ciliatæ, intus pubescentes. *Flores* minuti numerosi in panicula laxa terminali dispositi; *bracteæ* parvæ tamen manifestæ cum bracteolis similibus setaceæ. *Calyx* campanulatus alte in lobis 5 ovatis obtusis divisus. *Corollæ* crassiusculæ tubus brevissimus, lobi oblongi.

Sogere. Unnumbered specimen. According to the description this seems to be allied to *Grumilea micrococca* Laut. & K. Schum.; it is distinct in its almost complete glabrousness, its bright red colour, and the characters of the stipules and calyx. *Leaves* 10–20 cm. × 6–7 cm., with stalk as much as 2 cm. long; *stipules* 1·2 cm. long, and 1 cm. broad just above the base. Length of *panicle*, measured from the terminal node of the floriferous branch, 15 cm. From the same node arise the three primary branches of the inflorescence, the middle one 5–6 cm. in length; the width of the panicle is about 12 cm.

P. (§ Grumilea) sogerensis, sp. nov.

Ramulis validis ipsis in novitatibus glabris valde complanatis lævibus striatis. *Folia* inter majora crasse pergamacea late elliptica apice obtusa vix acuminata basi subobtusa, petiolo brevi valido, utrinque glabra; *venæ* utrinque conspicuæ supra impressæ subtus prominulæ, rete interveniente conspicuo, lateralibus primariis utrinque 13–15; *stipulæ* coriaceæ ovato-triangulares acuminatæ acutæ caducæ. *Flores* 5-meri inter minimos in cyma laxiuscula seriatim trichotoma terminali sessili dispositi, ramulis tenuiusculis 3 primariis elongatis olivaceo-pulverulentibus. *Calyx* late infundibularis glabrescens limbo integro; *corollæ* tubus extus glaber insuper parum ampliata, lobi reflexi ovati glabri.

Sogere. No. 465!

Related, according to the description, to *Grumilea apiculata* Warb., though readily distinguished by the venation and shape of the leaves, and the small sessile inflorescence. *Leaves* 12–19 cm. × 7–9·5 cm., with a stalk as much as 2 cm. long; *stipules* 1·5 cm. × 7 mm. near the base. Primary *cyme*-branches 4–5 cm. long; the inflorescence more or less corymbose, 8–10 cm. in diameter. *Calyx* with ovary barely 1 mm. in length; *corolla*-tube 3–4 mm., lobes 1–1·7 mm. long.

P. (§ Grumilea) direpta, sp. nov.

Arbor minusculus ramis validiusculis glabris lævibus, novellis valde sulcato-complanatis ipsis glabris. *Folia* firme pergamacea longiuscule petiolata late elliptica apice vix acuminata basi cuneata, utrinque nisi hic inde venæ centralis subtus in lateribus sparse rufo-puberula glaberrima; *venæ* supra qua subtus nisi primariæ valde prominentes subocclusæ, laterales utrinque 15–16; *stipulæ* caducæ majusculæ obovatæ breviter acuminatæ acutæ basin versus latum leniter angustatæ, dorso glaberrimæ. *Panicula* laxissima ampla longe pedunculata glabra, ramis primariis verticillatis, arcuatim demum adscendentibus. *Fructus* parvus pisiformis glaber, calyce minuto coronatus.

Sogere, 2500 feet. *Fr.* 19 October. No. 49!

A small tree, with greenish-white fruits; allied, apparently, to *Grumilea portus-Finschii* K. Sch. & Laut., and distinguished by the glabrous young twigs and stipules, the indumentum of the inflorescence, and the venation of the leaves. *Leaves* about 20 cm. × 10 cm., with stalk 3 cm. long; *stipules* 15 mm. long, and 7 mm. broad above the middle. *Peduncle* 12 cm. long; the fruiting *panicle* about 16 cm. long and 16 cm. wide. *Fruit* 4 mm. in diameter.

P. montana Blume var. GRACILLIMA, var. nov.

Foliis parvis, petiolis brevibus ramulis dilute flavis præsertim inflorescentiæ tenuibus.

Sogere, 2500 feet. *Fr.* 19 October. No. 37! 38!

This may be a new species; unfortunately no flowers are present on our specimens. The parent-species has been recorded from Java, Sumatra, the Malay Peninsula, and westward through Burma, Assam, as far as Silhet.

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SOMERSET NOTES FOR 1917.

By the Rev. Edward S. Marshall, M.A., F.L.S.

Comparatively little work was done, last year, at least in the southern districts, owing to other occupations and the restrictions on travelling. The most energetic observer has been Dr. H. Downes, F.L.S., (*D.*), of Ilminster; he noted 520 species in that neighbourhood, many of which were not on record for district 4 of Murray's *Flora*. My other principal helpers have been Messrs. B. W. Tucker (*T.*) and W. D. Miller (*M.*).

Thalictrum flavum L. 3. Curry Moor, *Rev. D. J. Pring.*

Ranunculus Drouetii F. Schultz. 4. Ashill: Ilton, *D.*—*R. peltatus* Schrank. 4. Common about Ilminster, *D.*; as is *R. sceleratus* L.—*R. auricomus* L. 4. Ilminster; Ashill, *D.*

Helleborus viridis L. 10. Mr. Tucker tells me that his plant from Lilycombe, Litton, was this, and not *H. fœtidus.* 4. In an orchard near Ilminster, *D.*

Berberis vulgaris L. 4. Hedges about Ilminster and Ashill, *D.*

Nuphar luteum Sm. 4. Ilminster; Donyatt; Ile Abbots; Ilton; Puckington, *D.*

Fumaria capreolata L. 4. Ashill, *D.*

Nasturtium palustre DC. 4. Ilminster, *D.* 10. By several ponds, Chewton Mendip, *T.*—*N. amphibium* Br. 10. By ponds off Field Lane, Chewton Mendip, *T.*

Arabis hirsuta Scop. 10. Chewton Mendip; not common, *T.*

Lepidium campestre Br. 4. Chilworthy Woods; Ashill, *D.*

Viola palustris L. 1. The white-flowered form *alba* Gregory was found near Winsford by *Miller.* A tall, strong, large-flowered plant from there, given to me, fresh, by *Miss A. G. Miller*, may be the undescribed forma *major* Gregory.—*V. epipsila* Ledebour. 1. Winsford, *M.*, sp.—*V. arvensis* Murray. 3. A small-flowered Pansy which I saw plentifully in a cornfield near Chipstable, 1916, has been named *V. arvatica* Jord. by Dr. Drabble.—*V. lutea* Huds. 1. On a grassy knoll near Winsford, at 950 feet; fully two miles east of the Exford station, *M.*, sp.

Polygala serpyllacea Weihe. 4. Cudworth, *D.*

Lychnis Githago Scop. 4. Ilminster; abundant at Buckland St Mary, *D.*

Cerastium semidecandrum Scop. 4. Hinton St. George, *D.*

Stellaria aquatica Scop. 4. Ilminster, *D.*

Spergula arvensis L. 4. Ashill; Buckland St. Mary, *D.*

Hypericum Androsæmum L. 4. Ashill; Ilminster; Buckland St. Mary, *D.*—*H. elodes* L. 4. Chard Reservoir, *D.*

Malva moschata L. 4. Very common about Ilminster, *D.*—*M. rotundifolia* L. 4. Hinton St. George; Dinnington, *D.*

Linum bienne Mill. 4. Broadway, *D.*

Geranium pusillum L. 4. Ilton; Whitelackington, *D.*

Rhamnus catharticus L. 10. Chewton Mendip, *T.*

Genista anglica L. 4. Chard Reservoir, *D.*

Ulex Gallii Planch. 9, 10. Commoner, at and near Chewton Mendip, than *U. europæus*, *T.*

Ononis repens L. 4. Ilminster; Broadway; Ashill, *D.*—*O. spinosa* L. 4. Ashill; Broadway, *D.*

Medicago arabica Huds. 4. Garden weed, Ilminster. *D.*

Melilotus altissima Thuill. 4. Ilminster; Ashill; Ilton, *D.*

Trifolium medium L. 4. Ilminster, *D.*—*T. hybridum* L. 4. Common about Ilminster, *D.*—*T. filiforme* L. 4. Ilminster; Ilton; Ashill, *D.*

[*Coronilla varia* L. 4. A patch by the roadside, Ashill; alien, *D.*, sp.]

Onobrychis viciæfolia Scop. 4. Waste ground, Ilminster, *D.*

Vicia tetrasperma Moench. 4. Ilminster; Ilton; Donyatt, *D.*—[*V. macrocarpa* Bert. (*V. sativa*, var. *macrocarpa* Moris) was abundant, last year, in a different cornfield from the one in which he found it, near Chewton Mendip, dis. 10, in 1916, *T.*]

Lathyrus Nissolia L. 4. Buckland St. Mary; below Castle Neroche, *D.*—*L. sylvestris* L. 4. Dowlish Wake; abundant at Merriott, *D.*

Prunus insititia L. 4. About Ilminster, *D.* (sent to me, in fruit).—*P. avium* L. 4. Ashill; Broadway, *D.* 10. Emborough Grove, *T.*—*P. Cerasus* L. 4. Broadway; Whitelackington, *D.*

Rubus Idæus L. 4. Castle Neroche, *D.*

The Rev. W. M. Rogers has kindly sent me a list of localities for Somerset Brambles, from his Distribution Book; those not previously (or wrongly) recorded are given below.

R. plicatus Wh. & N. 7. Murray's Stourton plant is var. **Bertramii*.

R. integribasis. 7. Linton's Castle Orchard specimen is named as of *Rogers* (distinct from P. J. Mueller's plant), by Dr. Focke, in *Species Ruborum* (*Rubi europæi*), 1914.

R. carpinifolius Wh. & N. 3. The Quantock plant mentioned by *Murray*, p. 104, belongs here, as he thought.

**R. incurvatus* Bab. 9. Edington, *Day*, 1914; "a good form," *W. M. R.* New for Somerset, I believe.

R. rhombifolius Whe. "I cannot now answer for this; but Fry's Downhead Common station (dis. 10) may be right, and perhaps others."

R. anglosaxonicus Gelert. 2. Culbone, *Babington* (in 1850).

R. Borreri Bell-Salt., var. **dentatifolius* Briggs. 1. By the Barle, in open woodland, between Hawkridge and Dulverton, *E. S. M.*, 1916; new for v. c. 5.

R. Drejeri G. Jensen. 2. St. Audries. 3. Wiveliscombe, *Murray*.—Var. *Leyanus* Rogers. 10. Downside, 1916, *Miss Todd*.

R. oigoclados Muell. & Lefv., var. **Newbouldii* Rogers. 8. Peatmoor, *H. S. Thompson*; apparently new for Somerset.

R. Babingtonii Bell-Salt. 3. Blackdown Hills, *Murray*.

R. Bloxamii Lees. 7. Pen Selwood ("a form?"), *Murray*. This may, perhaps, be the "Penridge" mentioned in my Supplement, p. 66.

R. scaber Wh. & N. 1. W. M. R. mentions that Murray's Dulverton gathering was so named by both Focke and Gelert.

R. thyrsiger Bab. 3. Cockercombe Drive, Quantocks, *H. S.*

Thompson ("apparently," *Rogers*; he does not mention Murray's Dulverton plant).

**R. horridicaulis* P. J. Muell. 3. Alfoxden, Quantocks, *D. Fry*, 1897. Queried by *Rogers*, as "a strong form"; if correct, it is new for the County.

**R. Bellardii* Wh. & N. 9. Wrington, 1916, *Miss Todd*. New for v. c. 6.

**R. acutifrons* Ley. 3 or 6. Near Barnsworthy, Blackdown, *Murray*. New for v. c. 5.

R. dumetorum Wh. & N., var. **fasciculatus* (P. J. Muell.). 10. Near Bath, *Babington*. Not previously recorded from the County.

R. corylifolius Sm., var. *conjungens* Bab. (*R. cyclophyllus* Lindeberg). 10. Stanton Drew, *D. Fry*.

Potentilla procumbens Sibth. 4. About Ilminster, *D.*

Poterium officinale Hook. fil. 1. Near Winsford, *M.*, sp.—*P. Sanguisorba* L. 4. Ashill: scarce, *D.*

Pyrus Aucuparia Ehrh. 4. Buckland St. Mary; Cudworth; Hinton St. George, *D.*

Chrysosplenium oppositifolium L. 3. Chipstable. 10. Abundant by streams in woods, etc., Litton & East Harptree, *T.*

Ribes rubrum L., α. *sativum* (Reichb.). 4. Bushy banks of the River Ile, between Ilminster Station and Donyatt; probably birdsown.

Cotyledon Umbilicus L. 4. Buckland St. Mary, *D.* 19. Emborough Grove, *T.*

[*Sedum sexangulare* L. 9. Walls at Burrington, *H. W. Pugsley*.]

Myriophyllum spicatum L. 10. Litton Reservoir, *T.*

Callitriche intermedia Hoffm. 10. Chewton Mendip, *T.*, sp.

Epilobium angustifolium L. 4. Crewkerne, *D.*—*E. roseum* Schreb. 10. The Harptrees, *T.*—*E. tetragonum* Curt. 4. Ilminster, *D.*

Hydrocotyle vulgaris L. 10. Emborough Grove, *T.*

Bupleurum rotundifolium L. 9. Allotment fields, Blagdon, *Mr. Westbrook* (fide *H. S. T.*).

Sison Amomum L. 4. Ilminster; Ashill, *D.*

Aegopodium Podagraria L. 4. Ilminster, *D.*

Adoxa Moschatellina L. 4. Ilminster; Ashill; Hinton St. George, *D.*

Rubia peregrina L. 4. Chaffcombe Woods, *D.*

Galium Mollugo × *verum*. 9. Rocks above Cheddar, with the parents, *H. S. T.*, sp.

Asperula odorata L. 4. Ashill; Donyatt, *D.* 10. Litton; the Harptrees, etc., *T.*

Kentranthus ruber DC. 4. Common on old walls about Ilminster, *D.* 10. Wall at Twerton (with *white* flowers), *H. S. T.*

Valerianella dentata Poll. 4. Ashill. *D.*

Scabiosa Columbaria L. 4. Hinton St. George, *D.*

Erigeron acre L. 4. Old walls, between Chard and Ilminster, *D.*

Filago germanica L. 4. Ilminster; and 6. Buckland St. Mary, *D.*

Inula squarrosa Bernh. 4. Hinton St. George, Dinnington, etc., *D.*

Bidens cernua L. 4. Knowle St. Giles; Chard Reservoir, *D.* 10. Ponds at Emborough and Chewton Mendip, *T.*—*B. tripartita* L. 4. Ashill; Ilton. *D.*

Achillea Ptarmica L. 3. Stream-side. between Cheddon Fitzpaine and Hestercombe, *M.* 4. Ashill; Broadway; Ilminster; Donyatt; Ilton, *D.* 9. Near Priddy, *T.*

Anthemis Cotula L. 4. Ashill; Broadway; Buckland St. Mary; Hinton St. George, *D.*—*A. nobilis* L. 4. Stocklinch; Whitelackington, *D.*

Artemisia vulgaris L. 4. Abundant at Merriott, *D.*

Arctium Lappa L. (*majus* Bernh.). 4. Seavington; Whitelackington, frequent, *D.*

Carduus crispus L. 4. Common around Ilminster, *D.*

Cnicus pratensis Willd. 4. Broadway, *D.*—*C. acaulis* Willd. 4. Chard; Ilminster; Broadway, *D.*

Serratula tinctoria L. 4. Donyatt; Ashill; Ilminster, *D.*

Picris hieracioides L. 4. Ilminster; Ashill, *D.*

Hieracium tridentatum Fr. 4. Hinton St. George; Dinnington, *D.* 10. Abundant on a wall in Harptree Combe, *T.* (so named by me, on fresh material, and confirmed at Kew).—*H. rigidum* Hartm., var. *trichocaulon* Dahlst. 9. Clapton in Gordano, *H. S. T.*, sp.—*H. umbellatum* L. 4. Common in the Ilminster district, *D.* 9. Clapton in Gordano, *H. S. T.*, sp.

Leontodon nudicaule Banks and Solander. 4. Buckland St. Mary, *D.*

Lactuca muralis Gærtn. 4. Ilminster, *D.*

Jasione montana L. 4. Buckland St. Mary, *D.*

Campanula Trachelium L. 10. Harptree Combe, *T.*—*C. rotundifolia* L. 9. Priddy, etc., *T.*

**Vaccinium Vitis-Idæa* L. 2. Smith's Combe, above East Quantockshead (apparently at about 500 to 700 feet), *Rev. C. Q. Knowles*, sp. Mr. Miller brought it to me, fresh (in ripe fruit), on September 16th. "There is quite a lot of it . . . Smith's (or Dane's) Combe splits into two; and the *Vaccinium* is all along the high ridge between the two streams" (*Knowles, in litt.*). This is a very important and unexpected addition to the County list, tending to confirm the old record for Devon; the two alleged N. Somerset stations, being in woods and on the Mountain Limestone, are surely incorrect. It should be searched for on the Brendon and Exmoor heights.

Primula veris × *vulgaris*. 10. Litton; the Harptrees, etc. *T.*

Lysimachia vulgaris L. 4. One plant was found by the roadside at Ashill by *D.*, and he posted me fresh pieces. It clearly came near *L. vulgaris*, but had rather strongly *recurved* petals, and an unusual habit. Material sent to Kew was, however, so named, without any qualification. It may be a garden form.—*L. Nummularia* L. 4. Ashill; Ile Abbots; Ilton; Combe St. Nicholas; Chard Reservoir, *D.*—*L. nemorum* L. 4. Ashill; near Ilminster, *D.*

Anagallis fœmina Mill. 10. A garden weed at Weston, near

Bath, *Miss Dora C. Martin*, sp.—*A. tenella* Murray. 4. Broadway; Buckland St. Mary, *D.*

Samolus Valerandi L. 4. Ilton, *D.*

Ligustrum vulgare L. 4. Very common about Ilminster; native, *D.*

Vinca minor L. 4. Donyatt; Ilton, *D.*

Blackstonia perfoliata Huds. 4. Ashill; Broadway; base of the Blackdown Hills, *D.*

Myosotis cespitosa Schultz. 4. Common about Ilminster, *D.*; as are *M. repens* G. & D. Don, *M. collina* Hoffm., and *M. versicolor* Sm.

Lithospermum officinale L. 9. Base of Burrington Combe, *H. S. T.*—*L. purpureo-cœruleum* L. 9. Edge of a wood near Cheddar, towards Draycott, at 500 feet, *H. S. T.*

[*Echium italicum* L.? 9. On the edge of a stony hillside, just opposite the principal house on Steep Holm, as well as on the slopes below, *Dr. J. Wiglesworth*, sp. This was forwarded, fresh, last June, and is either *E. italicum* or a near ally. The one inflorescence seen by me is broadly triangular (four inches long, by three across at the base); rachis hispid with stiff, shining white hairs, which are about one-fifth of an inch long: calyces linear, acute, densely hispid with yellowish-white pubescence, their segments linear, acute, almost equalling the corolla, which is pink, but dries bluish; style and stamens long, exserted. This plant is reported to come up regularly, and seems to be well established, though doubtless a recent introduction, as it had not been reported by previous visitors to the island.]

Hyoscyamus niger L. 4. Horton, near Ilminster, *D.*

Verbascum Thapsus L. 4. Fairly plentiful about Ilminster, *D.* 10. Emborough Quarries, *T.*

Linaria spuria Mill. 4. Abundant in cultivated ground, Ashill, *D.*

Veronica scutellata L. 4. Chard Reservoir, *D.*

Verbena officinalis L. 4. Kingstone; a garden weed, Dowlish Wake, *D.* 10. Coley; Chewton Mendip, *T.*

Mentha spicata Huds. 4. Old canal, between Chard and Ilminster, *D.* 10. By the River Chew at Coley, *T.*—*M. citrata* Ehrh. 9. "Mr. Tucker reports that this plant in Mr. White's original station near Priddy has become distinctly hairy beneath the leaves. In company with Miss Roper, he discovered another small patch, about three quarters of a mile away."—*Rep. Bot. Section, Somerset Archæological & Nat. Hist. Soc.*

Thymus ovatus Mill. 4. Windwhistle Hill, near Chard. *D.*

Calamintha montana Lam. 4. Kingstone; Donyatt, *D.*

Melissa officinalis L. 4. Horton, near Ilminster; Ashill, *D.* 9. Well established by a roadside between Congresbury and Churchill; roadside between Clapton in Gordano and Clapton Wick, *H. S. T.*

Scutellaria galericulata L. 4. Ilminster; Donyatt; Ilton; Chard Reservoir, *D.*—*S. minor* Huds. 4. Chard Reservoir; woods at Ashill and Ilminster, *D.* 10. Emborough Grove. *T.*

Stachys arvensis L. 4. Common about Ilminster, *D.*

Galeopsis angustifolia Ehrh. 4. Cornfields near Ilminster. *D.*—

G. Tetrahit L., var. *bifida* (Boem.). 3. Clatworthy; and 6. Whitestaunton, *W. Watson.*—Var. *nigricans* Brébisson. 3. Clatworthy, *W. W.* 9. Priddy, *T.*

Teucrium Scorodonia L. 4. Abundant about Ilminster, *D.*

Scleranthus annuus L. 4. Buckland St. Mary, *D.* (also in dis. 6, *W. W.*).

[*Amaranthus retroflexus* L. 4. Growing in some quantity on waste ground at Horton, Ilminster, and seems well established, *D.*]

Chenopodium polyspermum L. 4. Horton, *D.*—*C. rubrum* L. 4. Common about Ilminster; "one specimen five feet high," *D.*—*C. Bonus-Henricus* L. 10. Near Litton, *T.*

Polygonum Bistorta L. 4. Buckland St. Mary; Broadway, *D.*

Daphne Mezereum L. 10. Eaker Hill Wood, Chewton Mendip; one bush, *T.*—*D. Laureola* L. 4. Ashill, *D.*

Viscum album L. 4. Particularly abundant in the Ilminster district, *D.*

Euphorbia amygdaloides L. 4. Ashill; Buckland St. Mary, *D.*

Mercurialis annua L. 4. Ilminster, *D.*

Ulmus glabra Huds. 4. Hatch; Ilminster; Ashill, *D.*

Parietaria ramiflora Moench. 4. Ilminster, *D.* 8. On a bank of sea-sand, Burnham, *H. S. T.*; a strange habitat.

Salix purpurea L. 10. Litton Reservoir, *T.*, sp.; planted?—*S. aurita* L. 4. Common about Ilminster, *D.*—*S. repens* L. 4. Blackdown Hills; Windwhistle Hill, near Chard, *D.*

Populus tremula L. 4. Common in the Ilminster district, *D.*

Neottia Nidus-avis Rich. 4. Buckland St. Mary; Hinton St. George, *D.*

Spiranthes spiralis Koch. 4. Broadway; Ashill; Combe St. Nicholas, *D.*

Helleborine latifolia Druce. 9. Hedgebank near Priddy; also 10. East Harptree and Emborough Grove, *T.*

Orchis latifolia L. 4. Ilminster; Donyatt, *D.*

Habenaria conopsea Benth. 9. Hill-pasture above Blagdon, *H. S. T.*—*H. bifolia* Br. 9. Weston in Gordano, *Mrs. Sandwith.* Mendip plateau, between Eagle's Crag (Shipham) and Cheddar, *S. E. Maltby* (*teste H. S. T.*).—*H. virescens* Druce. 2. Between Oare and Malmsmead, *N. G. Hadden.*

Iris fœtidissima L. 4. Herne Hill, Ilminster; Cricket Malherbie, *D.*

Narcissus Pseudo-Narcissus L. 4. Donyatt, *D.*

Galanthus nivalis L. 4. Woods at Whitelackington, *D.*

Ruscus aculeatus L. 4. In hedges at Broadway and Ashill, often obviously planted, *D.*

Allium vineale L. 4. Ilminster; Ilton, *D.* Donyatt.

Colchicum autumnale L. 2. Meadow near Stringston, *Rev. J. Hamlet*; new for the district.

Narthecium Ossifragum Huds. 4. Blackdown Hills, *D.*

Juncus compressus L. 10. Harptree Hill, *T.*—*J. bulbosus* L. (*supinus* Moench). 4. Common in the Ilminster district, *D.*

Luzula multiflora DC. 4. Common about Ilminster, *D.*

Sparganium simplex Huds. 4. In the River Ile, between Ilminster and Chard, *D.*

Lemna trisulca L.; *L. gibba* L. 4. Ashill, *D.*—*L. polyrrhiza* L. 4. Knowle St. Giles, *D.*

Butomus umbellatus L. 4. Ilton; Barrington; Puckington; Ile Brewers, *D.*

Triglochin palustre L. 9. Priddy, *T.*

Potamogeton natans L. 4. Ashill, *D.*

P. polygonifolius Pourr. 4. Chard Reservoir; old canal, Ilton, *D.*

P. coloratus Hornem. 8. In several peaty roadside ditches, south of Shapwick Station; also south of the railway, between there and Ashcott Station; *C. P. Hurst*, sp. Fresh material was sent to me, March, 1917, queried as *P. alpinus* (*rufescens*), which, at this early season, it rather resembled; but the characters seemed to fit *P. coloratus* better, and Mr. Arthur Bennett, after he had seen living specimens, confirmed my suggestion. An interesting state.

P. pusillus L. 10. Litton Reservoir, *T.*

Obs. In a recent letter from Mr. Bennett he mentions that Dr. Hagström has determined a plant collected by the Rev. R. P. Murray at Baltonsborough, dis. 8, in August, 1881, and named by Ar. B. *P. pusillus*, var. *pseudo-trichoides*, to be *P. pusillus* × *trichoides* (× *P. franconicus* Fischer). "I have just looked up the specimens, and they are very *trichoides*-like." Although *P. trichoides* is not known for Somerset, it does occur in Devon; so further research is desirable.

Zannichellia palustris L. 4. Common about Ilminster, *D.* 9. Ponds near Priddy; also 10. Litton, *T.*

Eleocharis multicaulis Sm. 4. Chard Reservoir, *D.*

Scirpus lacustris L. 4. Donyatt, *D.*!

Eriophorum angustifolium Roth. 4. Broadway; Combe St. Nicholas, *D.*

Carex pulicaris L. 4. Buckland St. Mary; Broadway; Combe St. Nicholas, *D.*—*C. paniculata* L. 4. Common all over the Ilminster district, *D.*—*C. leporina* L. 4. Ashill; Donyatt; Broadway; Buckland St. Mary, *D.*—*C. gracilis* Curt. 8. Swamp among the sandhills, Burnham, *H. S. T.* ('*acuta* L.').—*C. Goodenowii* Gay. 4. Ilminster, *D.*—*C. pilulifera* L.; *C. panicea* L. 4. Common about Ilminster, *D.*—*C. pendula* Huds. 4. Ilton; Donyatt!, *D.*—*C. Oederi* Retz. 4. Dr. Downes sent me a typical specimen of this from his neighbourhood, but without precise locality.—*C. Pseudo-Cyperus* L. 4. Ilton, *D.*—*C. riparia* Curt. 4. Ilminster, *D.*—Var. *humilis* Uechtr. 8. Marsh on the Burnham Sandhills, *H. S. T.*

Milium effusum L. 10. Litton, *T.*

Avena pubescens Huds. 4. Not uncommon about Ilminster, *D.*

Molinia cærulea Moench. 4. Abundant on the Blackdown Hills; Combe St. Nicholas; Buckland St. Mary, *D.* 10. Chewton Mendip, *T.*

Poa nemoralis L. 4. Old walls between Chard and Ilminster, *D.*

Bromus secalinus L., var. *Billotii* Ascherson & Graebner (named at Kew). Cornfields, Chewton Mendip, *T.*; he describes it as having hairy glumes, so most likely our var. *velutinus* is intended.

Agropyron caninum L. 4. Hedges near Ilminster, *D.*

Blechnum Spicant Willd. 4. Blackdown Hills; Ashill; Chard, *D.* 10. East Harptree, *T.*

Polystichum aculeatum Roth. 4. Near Ilminster, *D.*—*P. angulare* Presl. 4. Donyatt. 10. Chewton Mendip; rare, *T.*

Lastrea spinulosa Presl. 4. Hinton St. George; slopes of Blackdown, *D.* 10. Garrow Bottom and Lady Wood, East Harptree, *T.*

Phegopteris Robertiana Braun. 10. Quite plentiful on the stonework of one of the bye-washes, Litton Reservoir, *T.*, sp.

Ophioglossum vulgatum L. 4. Broadway Forest; fine, and in considerable quantity, *D.*

Botrychium Lunaria Sw. 2. Rough field between Oare and Malmsmead, *N. G. Hadden.*

Equisetum maximum Lam. 10. East Harptree, *T.*—*E. limosum* L. 9. Mineries Bog; pond at Red Quar, Chewton Mendip; and 10. Bishop's Ponds, Chewton Mendip, *T.*

Lycopodium Selago L. 4. Near Castle Neroche, *D.*

Pilularia globulifera L. 9. "A friend interested in Botany tells me she found a specimen near Winscombe, a few years ago," *T. in litt.* Sole's "Blackdown" record may be the same; so far as I know, he never worked the southern districts (Blackdown Hills).

**Tolypella prolifera* Leonh. 3. Bridgwater and Taunton Canal at Charlton, between Creech St. Michael and Durston, mixed with *Callitriche truncata.* New for Somerset; the name has been confirmed by Mr. James Groves, who wrote that this was a good extension of its range. I saw very little of it, but had no time for a thorough search.

HOLY ISLAND PLANTS.

By E. Marsden Jones, F.L.S.

The following plants were noted at and in the neighbourhood of Trearddur Bay during a visit to Holy Island (v.c. 52) in August 1917:—

Castalia alba Wood. Streams in marsh below the Holyhead Golf Course, and in a pond between Trearddur Bay and Rhoscolyn.

Glaucium flavum Crantz. Above sea wall, nearly opposite the Trearddur Bay Hotel.

Diplotaxis muralis D.C. In garden at Fron Isallt, Trearddur Bay—*Cakile maritima* Scop. Above sea wall, near bathing huts, facing large bay.

Helianthemum Breweri (Planch.). I found a colony in 1913, between Trearddur Bay and Rhoscolyn, visited the place again in August 1917, and found it thriving. The place is about four miles from Holyhead Mountain.

Silene maritima With. Plentiful all along the coast. *S. anglica* L. Ploughed field not far from Salt Lake.

Erodium cicutarium L'Hérit. On waste sandy ground at beginning of sandhills, facing large bay.

Genista anglica L. Heathy ground at edge of cliffs, to left of Darien Hotel.

Rosa spinosissima L. Very plentiful on waste sandy ground at beginning of sandhills, facing large bay.

Sedum Telephium L. In fields right and left of the footpath that comes out near the Holyhead Golf Course, after crossing marsh.

Drosera rotundifolia L. Marshy place between Trearddur Bay and Rhoscolyn.

Lythrum Salicaria L. Plentiful in marsh below the Holyhead Golf Course; three forms found.

Epilobium parviflorum Schreb. Marsh below the Holyhead Golf Course.

Hydrocotyle vulgaris L. Marshy ground in Penrhos Park, near Salt Lake—*Eryngium maritimum* L. Edge of sandhills, facing large bay—*Conium maculatum* L. On hedge bank in field on the way to Salt Lake—*Crithmum maritimum* L. On sea cliffs—*Œnanthe Lachenalii* C. Gmel. Moist ground below Darien Hotel—*Angelica sylvestris* L. Marsh below the Holyhead Golf Course.

Scabiosa arvensis L. Corn field, Trearddur Bay.

Solidago Virgaurea L. Hill at side of Fron Isallt.—*Aster Tripolium* L. Salt marsh—*Inula Helenium* L. In field by road side, near Porth Diana. A well established clump, but from its position probably a garden escape. *I. crithmoides* L. On sea cliffs at side of Darien Hotel.

Jasione montana L. Hilly ground near Fron Isallt.

Limonium vulgare Mill. Very abundant on salt marsh. *L. binervosum* C. E. Salmon. On sea cliffs at side of Darien Hotel.

Anagallis tenella Murr. Marshy place between Trearddur Bay and Rhoscolyn—*Samolus Valerandi* L. Road side on the way to South Stack, and at edge of stream in salt marsh.

Gentiana campestris L. Field near Salt Lake, and between Fron Isallt and the Darien Hotel.

Cynoglossum officinale L. On sandhills, Trearddur Bay.

Calystegia Soldanella Br. On sandhills, Trearddur Bay.

Veronica scutellata L. Marshy ground in Penrhos Park, near Salt Lake—*Pedicularis palustris* L. Marsh below the Holyhead Golf Course.

Scutellaria galericulata L. Marshy ground in Penrhos Park, near Salt Lake—*Stachys arvensis* L. In garden at Fron Isallt.

Plantago maritima L. Abundant all along the coast. *P. Coronopus* L. Abundant all along the coast.

Atriplex laciniata L. Trearddur Bay—*Salsola Kali* L. On sand in large bay.

Polygonum Raii Bab. Above sea wall nearly opposite the Trearddur Bay Hotel.

Euphorbia Paralias L. At edge of sandhills, facing large bay. *E. portlandica* L. Sea cliffs by side of steps on way down to South Stack Lighthouse.

Spiranthes spiralis Koch. On heathy ground on left of road between Fron Isallt and the Darien Hotel, on hill at side of Fron

Isallt, and in field behind the hill, very abundant—*Orchis pyramidalis* L. One plant near little Church on sandhills.

Scilla verna Huds. Very abundant all along the coast—*Narthecium Ossifragum* Huds. Marshy place between Trearddur Bay and Rhoscolyn.

Alisma lanceolatum With. Stream in marsh below the Holyhead Golf Course.

Triglochin palustre L. Marsh below the Holyhead Golf Course. *T. maritimum* L. At edge of stream in salt marsh.

Asplenium marinum L. On sea cliffs along the coast.

TWO NEW PLANTS FROM MACEDONIA.

By A. J. Wilmott, B.A., F.L.S.

The plants described below are from a small but interesting collection of plants made last autumn by Mr. J. Ramsbottom in the neighbourhood of Salonica, including Mt. Hortiasch and Mt. Kotos. Mr. Ramsbottom has been lent from the British Museum to the War Office for protozoological work with the Salonica Force. The collection is in the National Herbarium, and it is hoped that it will be materially added to during the course of this year. Small collections from Macedonia are received at the Museum from time to time, and a full account of them will be given later.

Paliurus microcarpus, sp. nov. Ab *Spina-Christi* Mill. (*P. aculeato* Lam.) differt foliis quam istius latioribus, basi magis rotundatis minus obliquis, petiolis brevibus (2–5 mm. long.) vel subnullis, fructubus inferiore parte profunde poculiformibus nequaquam pateriformibus (9–10 mm. lata, 6–7 mm. profunda) in alam perangustam (·5–2 mm. latam) adscendentem vel plus minus horizontaliter patentem procurrente, fructu igitur parvo solum 11–14 mm. lato.

Near Salonica. "Common on plateau." *J. Ramsbottom*, no. 98.

P. microcarpus is at once distinguishable by its fruit, which appears small owing to the absence of the broad (5–9 mm.) wing characteristic of *P. Spina-Christi.* The fruits of the latter are 18–30 mm. diam., although the saucer-shaped basal portion is actually smaller than the tea cup-shaped base of *P. microcarpus.* The fruit of *P. microcarpus* reminds one more of those of some Chinese species, an interesting fact in view of the statement that the two areas of distribution of *Paliurus* are discontinuous. The specimen is extremely fructiferous, a sprig 20 cm. long bearing 8 branches 9–11 cm. long (shorter than in *P. Spina-Christi*) and 60 fruits. The differences indicated in the leaf-characters may prove to be of individual nature, for *P. Spina-Christi* is variable in its leaves, although no specimen seen quite matched our specimen in leaf.

Calamintha epilosa, sp. nov. Perennis. Caules striati (c. 40 cm. alti) ima basi decumbentes (c. 2 mm. diam.) densissime minutissimeque glandulosi pilis albis nisi singulis sparsis brevibus retrorsum falcatis ad angulos prope basum destitutis: rami numerosi rigide ascendentes iterum ramosi, omnes apice copiose floriferi. Folia subsessilia, lamina elliptica ad late elliptica integra vel paucidentata (c. 12 mm. long. et 7 mm. lat., petiol. c. 1 mm.) pilis destitutis sed sicut caules densissime minutissimeque glandulosa, glandulis magnis sessilibus (qui in *C. suaveolente* et *C. patavina* conspicui sunt) omnino destitutis, costæ pag. inf. eminentes costam marginalem formantes aliquando in dentes inconspicuos acuminatos projicientes sed sæpius in costam proximam anastomosantes, costa media in acumen procurrente. Folia floralia minus manifesta quam in *C. patavina* sed magis quam solemniter in *C. suaveolente*, inflorescentia ergo foliacea. Calices (7 mm. long.) eis *C. suaveolentis* forma persimiles sed constricta superiore parte longiore, dentibus majoribus sed forma (ratione longi latique) eadem, setoso-ciliatis pungentibus, tubo indumento sicut in foliis, pilis omnino destitutis. Corollæ (12 mm. long.) eis *C. suaveolentis* similes.

Near Salonica. *J. Ramsbottom*, no. 26, "Amongst oak-scrub, c. 500 m."

C. epilosa differs from all the allied species in the complete absence (except at the very base) of long pilose hairs. Even the veins of the calyx-tube lack them. The extreme density of the minute glandular pubescence throughout the plant occurs in no other allied species. The peculiar rapidity of the whole plant gives it a facies distinct from any of its allies. The internodes, both of the stem and inflorescence, of which there are 4–6 well-developed whorls of flowers, are longer, 12–20 mm. except at the apex, than in *C. suaveolens*, making the plant open and not compact. The corolla is pinkish mauve, drying bluish mauve.

I am unable to see that the teeth of the upper and lower calyx-lips in *C. suaveolens* are, as Halácsy (Fl. Græc. ii. 544, 1902) states, "subsimiles." The three of the upper lip are much broader than those of the lower lip, but being plicately folded, their greater breadth is almost entirely obscured. *C. patavina* is founded on *Thymus patavinus* Jacq. Obs. Bot. iv. p. 7, t. 87 (1771), which from the figure and description is evidently *C. adscendens* Moench. Further, Jacquin's plant is "Clinopodium perenne, pulegii odore, Majoranæ folio, Patavinum" of Boccone, seeds of which were transmitted to Jacquin by several botanists. In the National Herbarium are specimens from Boccone himself, which are evidently *C. adscendens*. There would therefore seem to be no cause for confusion in the application of the name. I am unable to distinguish *C. hungarica* Simonk. from *C. patavina*.

To judge from herbarium specimens, *C. patavina* and *C. suaveolens* are either very variable or there are several plants which await discrimination. There is, however, no specimen in the National Herbarium or at Kew which matches this plant.

LADY ANNE MONSON

(c. 1714–1776).

SUCH notices as have appeared in general literature of Lady Anne Monson make no allusion to that aspect of her character which earned for her what may be termed permanent distinction; for Linnæus named in her honour the genus *Monsonia* (Mant. i. 14: 1767) and his son probably the beautiful species *M. filia* (Suppl. 341: 1781)—a name antedated by *M. lobata* Mont. in Gothob. Wet. Samk. Handb. i. Wet. Afd. ii. t. i. (1780): this reference I take from *Index Kewensis*, not having seen the work quoted.

The *Dictionary of National Biography* (xxxviii. 196) at the end of its account of George Monson (1730–1776) has the following paragraph:—

"He married in 1757 Lady Anne Vane, daughter of Henry, Earl of Darlington, and widow of the Hon. Charles Hope Weir, who was four years his senior. Her mother was Lady Grace Fitzroy, and she was thus a great-granddaughter of Charles II. There was some scandal about her early life; she was a prominent figure in Calcutta society, and 'a very superior whist-player' (Macrarie, *Diary*). She died on 18 Feb., 1776. They had no children."

The "scandal," as we learn from a footnote in Toynbee's edition of the *Letters of Horace Walpole* (vi. 101) was of the nature of a divorce; but this is a matter with which we are not concerned: the object of the present note is to call attention to Lady Anne's association with at least two branches of natural history, in which she seems to have attained a proficiency as considerable as that commemorated in connection with the card-table.

George Monson, who obtained a major's commission in 1757, the year of his marriage, sailed with his regiment in the following year for India, where he succeeded to various posts, returning to England in 1764. In 1773 he was named one of the Supreme Council of Bengal, and arrived at Calcutta in October, 1774. In 1776 he resigned his position with the intention of returning to England, but he died on the 25th of September, his wife's death having, as we have seen, preceded his by some months.

It was on the occasion of her journey to Calcutta in 1774 that Lady Anne visited Thunberg at the Cape—a visit thus recorded by Thunberg under that year's date:—

"There had arrived from England, in order to proceed to Bengal, Lady Ann Monson, who had undertaken this long and tedious voyage, not only for the purpose of accompanying her husband, who went out as colonel of the regiment in the East Indies, but also with a view to indulge her passion for natural history. This learned lady, during the time she staid here, made several very fine collections, and particularly in the animal kingdom. And, as I had frequently had the pleasure, together with Mr. Mason [Masson], of accompanying her to the adjacent farms, and, at the same time, of contributing greatly to the enlargement of her collections, she had the goodness, before her departure, to make me a present of a valuable ring, in remembrance of her, and of the friendship with which she had honoured me. She was a lady about sixty years of age, who, amongst other languages, had also some knowledge of Latin, and had, at her own expense, brought with her a draughtsman, in order to assist her in collecting and delineating scarce specimens of natural history" (*Travels*, ii. 132). The insects collected by Lady Anne in Bengal were bequeathed by her to Ann Lee of Hammersmith (see Journ. Bot. 1917, 66) and were seen by Thunberg at Hammersmith in 1778 (*op. cit.* iv. 290); it would hence appear that the two women were acquainted before Lady Anne left England.

In his *Flora Capensis* (fasc. i. 7: 1807) Thunberg pays a further tribute to Lady Anne's capabilities:—

"Monsson [*sic*], Anna, Angl., Florum et Insectorum amore ducta, cum marito carissimo in Bengaliam iter suscipere non recusavit. In hocce promontorio commorans, qvovis fere die me et Massonio comitibus, in urbis viciniis freqventes et operæ pretio dignas instituit excursiones botanicas, curiosa varia congessit atqve suâ inter Botanophilos carâ memoriâ optime se dignam reddidit."

The gloss put upon this reference by MacOwan (Trans. S. Afr. Phil. Soc. iv., xxxviii) seems unjustifiable: Thunberg, he says, "speaks of her collections in somewhat depreciatory terms: 'curiosa varia congessit,' that is, these were ladies' specimens." No specimens of Lady Anne's collecting are known to exist, but that Thunberg had no intention of depreciating her work is evident from the passage already quoted from his *Travels*. A tribute to her botanical knowledge is paid by Smith, who in Rees's Cyclopædia writes:—"*Monsonia* is designed to commemorate the late Lady Ann Monson, a lady of distinguished talents, as well as of eminent botanical taste and knowledge, who by a long residence in the East Indies had great opportunities of cultivating the study of plants, as well as insects. We trust we shall betray no inviolable secret, in recording that it was to this lady that the late Mr. Lee alluded in the preface [p. xii] to his *Introduction to Botany*, first published in 1760, where he says he was enjoined not to acknowledge his obligations to those who had kindly helped him in his undertaking. A most elegant East Indian *Illecebrum* was first chosen by Koenig, if we mistake not, to bear the name of *Monsonia*, which remains as its specific appellation; and a more distinct genus, of greater splendour, has been selected for the purpose."

I cannot find that the name *Monsonia* has been published elsewhere for the East Indian plant, nor that Lady Anne has been mentioned in connection with it. It was named *Illecebrum Monsoniæ* by Linn. fil. (Mant. 161 (1781)); he received it from Koenig, who also sent it to Retzius, who published it (Obs. ii. 13) as *Celosia Monsoniæ*: it is now placed in *Æerua*. The specific name is miswritten *Monsonia* by recent authors: *e. g.* by Hook. fil. in Fl. Brit. Ind. iv. 728—who wrongly cites Retzius, Martius, and Wight for *Monsoni*a and Linn. fil. for *Monsoni*um!—and in the *Index Kewensis*.

I do not find many incidental references to Lady Anne Monson in contemporary literature: one, however, occurs in Andrews's *Botanists' Repository*, t. 276 (1803), where it is said that her "enthusiasm in pursuing the study of natural history knew no bounds; and whose liberal and fostering hand contributed more, perhaps, than any of her contemporaries, by her encouragement and example, to the then incipient, but now so prevailing taste for the study of botany."

James Britten.

NOTES OF SEDUM.—II.

By R. Lloyd Praeger.

(Continued from Journ. Bot. 1917, p. 215.)

Sedum (ser. Aizoonta) **floriferum**, sp. nov.

Species sinensis *S. hybrido* L. et *S. kamtschatico* Fisch. & Meyer valde affinis. Sepalis linearibus aut oblanceolatis (nec basi latis ut in speciebus sectionis *Aizoontis* pluribus) foliisque subsimilibus cum priore concordat; caulibus annuis autumno surgentibus (nec perrennibus nec radicantibus) carpellisque ab illa specie differt et ad *S. kamtschaticum* appropinquat; ab ambolus caulibus ramos multos breves ex parte superiore edentibus aspectum distinctum conferentibus differt.

Herba perennis glabra, caules steriles non edens. *Caudex* brevis, ramosis, lignosus. Radices lignosæ. *Caules* annui, satis numerosi, diffusi vel adscendentes, supra leviter scabrosi, circ. 15 cm. longi, foliosi, in parte superiore ramos multos breves floriferos edentes. *Folia* alterna, coarctata, sessilia, spathulato-oblanceolata, basi cuneata, supra medium dentata, apice obtusa, 2·5–4 cm. longa, ·8–1 cm. lata; ea ramorum consimilia, sed multum minora. *Cymæ* terminales et laterales, satis densæ, planæ, 2·5–5 cm. diametro. *Flores* 5-meri, 1·5 cm. diametro. *Sepala* inæqualia, valde carnosa, linearia aut oblanceolata, obtusa, prope ad imum fissa, viridia. *Petala* patentia, lanceolata, acuta, lutea, 7 mm. longa, 2 mm. lata, pone apicem apiculum ferentia. *Stamina* 10, petalis breviora, 5 mm. longa, filamentis viridescentibus, antheris rubro-aureis. *Squamæ* minutæ, quadratæ, integræ, viridescentes, translucentes. *Carpella* erecta, demum satis recurvata, patentia eis *S. kamtschatici* persimilia sed triente minora ut in *S. hybrido*, staminibus æqualia aut eis paullo breviora, gracilia, viridescenti-aurea, stylis longis gracilibus capitulatis coronata.

Seed collected at or near Wei-hai-Wei was sent to Kew by Mr. Liardet in 1911, and by the kindness of the Director I have had the opportunity of studying the plant throughout the year in my own garden.

An abnormal and curious specimen in the British Museum may be referred to *S. floriferum*. It is from Hance's herbarium, and is labelled "Chifu, æst. 1872 (F. B. Forbes)." It has a straight fasciate stem, which divides twice into two, and fuses again, bearing many short (3–5 inches), straight, small-leaved branches, some of which have flowers. The apex and base of the stem are missing. The branches are more scabrid than in my plant, but in other characters it agrees fairly well. Chifu lies only 50 miles from Wei-hai-Wei, so the present known range of the plant is a small part of the Shan-tung promontory. The *Aizoon* group to which it belongs has its geographical centre in this portion of Asia.

Maximowicz divided the closely allied and variable species of his Series *Aizoonta* into two groups:—*S. hybridum* on the one hand, with semi-erect carpels, and *S. Aizoon*, *S. Selskyanum*, *S. Middendorffianum*, and *S. kamtschaticum* on the other, with patent fruiting carpels. Other good characters which separate *S. hybridum* from its allies hitherto described are its sepals not splayed out into a wide base, its production of barren stems, and its creeping habit. *S. floriferum,* in its leaves and flowers, and particularly in its sepals, comes very near *S. hybridum*, but its growth form is quite different, and approaches that of *kamtschaticum*, differing only in its production of many axillary branches, which give the plant a distinctive bushy appearance. Elsewhere in the *Aizoon* group this character is found, though to a less extent, in *S. Yabeanum* Makino, a recently published Japanese species, which is described as having "stems often provided with a few sterile branches at the middle portion."

SEDUM HIRSUTUM All. var. BÆTICUM Rouy in Bull. Soc. Bot. de France, xxxiv. 441, 1887 (as subspecies). "Diffère du *S. hirsutum* par son port plus robuste, la villosité glanduleuse de toute la plante, les feuilles relativement plus allongées, les fleurs du double plus grandes, à pétales ovales-aristés (et non oblongs-lancéolés aristés), visiblement multinervés, les carpelles plus courts, plus larges, et moins longuement acuminés."

Under this form, which comes from the Sierra de Palma near Gibraltar, may be placed a plant collected by Miss Luckham in southern Spain (locally uncertain) a few years ago, and sent to Wisley. It agrees with Rouy's description in all points except that the flowers are $1\frac{1}{2}$ times, not twice as large (in diameter), and are not visibly multinerved. In appearance it is very distinct, on account of its large size and pale green colour. I have grown it for several years.

In this Journal for 1914 (p. 12) Major Wolley-Dod has combined Rouy's plant with *Umbilicus Winkleri* Willkomm in Acta Soc. Bot. Germ. 1883, 268 (from S. Roque, Gibraltar). But the latter plant, which is excellently figured and described by Willkomm in Illustr. Flor. Hisp. i. pl. 74*a*, p. 108, is clearly distinct at least from Miss Luckham's plant. It has ciliate petals, with many green veins, adnate in the lower two-thirds (instead of non-ciliate petals with a red median vein and free save at the very base), drooping fruit pedicels (instead of erect), and glaucous foliage (instead of green); also it seems from the figure to be a much stouter plant without the runner-like branches characteristic of strong plants of *hirsutum* and its varieties. The multinerved character of the petals in Rouy's plant is a step towards *Winkleri,* and in the absence of this character in my plant I hesitate either definitely to assign it to *bæticum* or to question Wolley-Dod's uniting of *bæticum* and *Winkleri*. But Miss Luckham's plant is so distinct and so near *bæticum* that it seems best to place it there.

Sedum (Sect. TELEPHIUM) **Taquetii**, sp. nov.

Species coreana *S. Telephio* L., *S. maximo* Suter, *S. alboroseo* Baker, affinis, a quibus omnibus floribus majoribus viridi-purpureis maximeque carpellis longioribus apice divergentibus distinguitur; *S. maximo* et *S. alborosea* proxima; cum priore foliis sessilibus, cum altero floribus bicoloratis concordat; habitu *S. alboroseo* appropinquat sed color ejus speciei pallide viridis abest, foliis cauleque colorem atroviridem *S. Telephii* habentibus.

Herba glabra perennis. *Caudex* brevis, carnosissimus, radices tuberosas fusiformes emittens. *Caules* annui, erecti, simplices, satis robusti, leves, teretes, infra nodos incrassati, 1–1½ pedales, triente superiore ramos adscendentes nonnullos sæpe emittentes. *Folia* opposita, sessilia, internodia aequantia aut superantia, elliptica, basi et apice rotundata, leviter obtuseque dentata, carnosa, atroviridia ± purpureo-punctata, 6–8 cm. longa, 3–4 cm. lata. *Corymbi* terminales et laterales, satis densi, rotundati, 2·5–5 cm. diametro, laterales ad terminales non pertinentes. *Flores* 5-meri, ad 9 mm. longi, magnitudine satis variabiles pedicellos æquantes. *Calyx* viridis, carnosus, segmentis lanceolatis vel deltoideis, obtusis, 2 mm. longis, parte concreta 1 mm. longa. *Petala* lineari-lanceolata, obtusiuscula, calycem quadruplo superantia, ad 9 mm. longa, pallide viridia, prope basim albescentia. *Stamina* 10, corollam æquantia, filamentis albescentibus, antheris ovatis pallide rubris epipetalis triente inferiore adnatis. *Squamæ* ligulatæ, strictæ, emarginatæ, quadruplo longiores quam latiores, albescentes, apice flavæ. *Carpella* longa, gracilia, erecta, apicibus divergentibus in stylos breves attenuatis, infra attenuata, corollam æquantia vel paullo superantia, viridia, purpureo-lineata, parte superiore lateris interni atropurpurea.

Hab. Korea.

Specimens were received in 1915 from the Upsala University Botanic Garden, and when I reported the species as requiring study, the Curator very kindly sent his only plant, which I have had under observation for two seasons. It was labelled "Sedum sp. Korea spont., Abbé Taquet. Wien. Dendrol. Ges. 1913." I have not been able to match it at Kew or the British Museum.

In the size of its flowers (petals up to 9 mm. long), and especially of its carpels (up to 10 mm.) this species differs from all others of section *Telephium*, in which the petals and carpels are mostly 4 mm. long, the largest being *S. spectabile* Boreau, with petals and carpels attaining 6 mm. *S. angustum* Maxim., *Rosthornianum* Diels, *verticillatum* L., *viridescens* Nakai, and *viriparum* Maxim., are separated (among other characters) by their 3–4 or 4–5 verticillate leaves; and *cærulans* Leveillé & Vaniot, *kagamontanum* Maxim., *Telephium* L., and *sordidum* Maxim., by having their leaves alternate. There remain of the erect-stemmed Telephiums only *S. viride* Makino, which has petiolate leaves, and yellowish-green flowers with erect carpels and petals 5·5 mm. long; *S. Bonnafousi* R. Hamet, a plant of very different growth, with petals about 5 mm. long; and *maximum* and *alboroseum*, which have been already dealt with.

SEDUM VERTICILLATUM L., var. NIPPONICUM, var. nov.

In Bull. Acad. Impér. des Sciences de St. Pétersbourg, xxix. 141 (1884) under *S. alboroseum*, Maximowicz writes:—"Formæ distinctæ duæ adsunt: typica, crassicaulis crassifolia macrophylla, ad quam exempla culta omnia et spontanea *Yezoënsia* pertinent, et nipponica spontanea: caule gracile, foliis in sicco æque tenuibus ac in *S. verticillato*, cui, foliis oppositis exceptis, omnibus punctis simillima. An igitur hæc forma *nipponica* potius pro var. oppositifolia *S. verticillati* habenda?"

A plant which agrees exactly with the second form above has been grown at Kew for many years under the name *S. latifolium* (a synonym of *maximum*). The flowers (which Maximowicz does not specially mention) are those of *verticillatum*, and the habit, colour, etc., of the plant conform to that species, not to *alboroseum*. Maximowicz's question can therefore certainly be answered in the affirmative, and the plant must stand as a variety of *S. verticillatum*, characterized as follows:—

Var. NIPPONICUM, nov. var.—Caulis dimidio minor quam in forma typica, gracilis; folia opposita.

Young plants of *S. verticillatum*, also weak stems of mature plants, have opposite leaves, and sometimes even the lower leaves of strong stems are opposite; so this variety represents a form in which immature characters are persistent. Probably a wild Japanese form, but at present known only from gardens in Nippon and England.

THE "EMENDATION" OF LINNEAN PLANT-NAMES.

BY THE REV. E. S. MARSHALL, M.A., F.L.S.

MR. LACAITA has earned the gratitude of botanists by his masterly paper (pp. 97–105) on *Leontodon hirtus* L.; and further contributions from his pen will be eagerly welcomed. But the footnote on p. 98 seems to me unjustifiable, anyhow as regards this particular case.

He there remarks:—"Linnæus wrote [*Leontodon*] *hirtum*, but it is surely the *ne plus ultra* of pedantry to perpetuate the false genders of Linnæus, or of other authors who, like him, in 'Greek are sadly to seek.'"

Charges of pedantry sometimes react upon those who make them; and the present instance may be an example of this.

Leontodon is not mentioned either in Liddell and Scott's Greek nor in Andrews's large Latin Lexicon. The form of λεόντοδον favours a neuter gender; and Latin words ending in "n" are mostly neuter. Also, in founding a new genus, under his binominal system, Linnæus surely had a right to settle its sex.

There is yet another objection against such corrections: namely, that "a man should not be made to say what he has not said." Linnæus wrote *Erigeron acre* and *Tragopogon pratense*; ignoring (whether by accident or design) the fact that these generic names were masculine in Greek, as well as in Pliny's Latin. To write "*Erigeron acer* L." and "*Tragopogon pratensis* L." is, I submit, both a mis-statement of fact and a piece of pedantry.

Even good classical scholars, like other people, sometimes blunder, as in the case of *Hieracium candelabræ* (for *candelabri*). But I think that such slips are better left uncorrected; and that *Ranunculus acris* L. should be allowed to pass, rather than follow "purists," and write *R. acer*. Nor are the supposed improvements by any means always really such. Lange states that "*Polygala* is neuter" (Haandb. Danske Flora, p. 707), on the analogy of γαλα; but the Greek name was πολύγαλον, and Pliny made his *Polygala* female.

According to Andrews, Pliny used *Orchis*, masculine, for a globular, scaleless fish; and, feminine, for a plant. Here, quite soundly, Linnæus followed him as regards the latter.

Rouy's *Flore de France*, though extremely useful, abounds in eccentricities, and is an exasperating work, not least because of its many needless changes of names. Mr. W. H. Beeby shewed sound common-sense when he wrote to me, about thirty years ago, that he had decided to adopt the author's spelling, even in such extreme cases as that of *Juncus lampocarpus* Ehrhart. *Uniformity* is, after all, the only rational system of nomenclature.

ARENARIA CILIATA L.

IN the *Nyt Magasin for Naturvidenskaberne*, lv. pp. 215–225 (1917), Messrs. Ostenfeld and O. Dahl, in a paper entitled "De nordiske formen av Kollebivarten *Arenaria ciliata* L.," divide the above species into three subspecies, giving descriptions in Danish and Latin. From this I extract the parts that will especially interest British and Irish botanists.

"1. Subsp. HIBERNICA nob. foliis anguste oblongo-obovatis, subacutis margine distincte ciliatis, subtus parce pubescentibus, distincte nervosis; sepalis distincte nervosis, dorso pubescentibus; petalis sepalis plus quam duplo longioribus; caulibus pedunculisque dense pubescentibus.

"*Hab.* Hibernia: Sligo: limestone cliffs of the Ben Bulben Range, 1000–1950 feet.

"*Syn. A. ciliata* auct. britan. e.g. *J. T. Mackay*, Fl. Hibern. 1836, 47. *R. L. Praeger*, Tourist Fl. of West of Ireland, 1909, 126.

"*Icon. English Botany*, ed. 1, tab. 1745! *R. L. Praeger*, l. c. pl. 16 overst."

The authors have seen a specimen from Ben Bulben.

"2. Subsp. PSEUDOFRIGIDA nob. foliis oblongo-obovatis vel obovatis, obtusis, margine basi saltem distincte ciliatis; sepalis indistincte nervosis, dorso glabris; petalis sepalis plus quam duplo longioribus: caulibus pedunculisque dense pubescentibus, pedunculis brevibus.

"*Hab.* Norv. arct., Lappon. Ross., Rossia arct. Spitzbergen. Novaja Semlia. Waigatsch. Groenl. orient.

"3. Subsp. NORVEGICA (Gunn.) Fries. foliis oblongo-obovatis vel late obovatis, acutis, glabris, margine nudo vel parce et sparse basi ciliato; sepalis enervis vel subenervis, dorso glabris; petalis sepalis vix duplo longioribus, caulibus pedunculisque sparse pubescentibus, pedunculis mediocribus.

"*Hab.* Norvegia: montibus occident .... Finmarkia; Suecia: rarius, Jämtland et Lapponia; Shetland: Uust; Island: per totam insulam distributa; Groenland. occid.: ....: Ellesmereland: Fram Harbour; Labrador (?); Canada: Mount Albert.

"*Syn. A. norvegica Gunnerus*, Fl. Norveg. 11 (1772), no. 1100, p. 144, tab. ix. fig. 7–9. *Sowerby*, English Botany, Supp. t. 2852 (1843); *Edmanston*, Fl. Shetland, 1845, 27; ***Babington***, Man. Brit. Botany, ed. 8 (1881), 58.

"*A. humifusa* Wahlenb., Fl. Lapp. (1812) 129.

"*A. ciliata*, subsp. *norvegica* (Gunn.) *E. Fries*, Fl. Suec. Mantiss. ii. (1839) 34; *Hooker*, Student's Flora (1884), 65. *A. ciliata*, δ. *norvegica* (Gunn.). *F. N. Williams*, Revis. of Arenaria in Journ. Linn. Soc. xxxiii. (1898) 419.

"*A. ciliata* var. *humifusa* Hartman, Skand. Fl. ed. 4 (1843) 141."

The authors cite specimens from Shetland (Unst, Beeby): they do not quote the W. Sutherland habitat, specimens thence not being in the Copenhagen herbarium. They do not include *A. gothica* Fries, but merely mention it in a footnote. Having cultivated the Gotland plant with the Yorkshire one for some years, I quite agree with them in this. They exclude the Swiss, Spanish, the Alps, Apennine and Carpathian plants, noting that the Swiss plant "differt imprimis multitudini ciliarum"; but do not place these under another subspecies.

I have never been able to obtain living specimens of our *norvegica* or *ciliata*; if these could be obtained and cultivated side by side it would maintain or disprove the authors' contention. The paper contains much interesting matter besides that which has been quoted, and should be consulted whenever possible by those working at *Arenaria*.

ARTHUR BENNETT.

SHORT NOTES.

PLANTAGO SABRINÆ Druce. In the *Report* for 1914 of the Botanical Exchange Club, p. 73, Mr. G. C. Druce writes:—"PLANTAGO CORONOPUS, var. SABRINÆ Baker and Cardew. I brought home roots from the Steep Holme, and although the plant has increased in size and in the elongation of the leaves, yet the facies and characters remain distinct. I have dissected the ripe fruit and find as Miss Cardew and Mr. Baker did, *Report* 28, 1911, that its alliance is with *Coronopus*, not with *Serraria* which in appearance it closely resembles.

Evidently it should be raised to specific rank as *P. sabrinæ* (Baker and Cardew) comb. nov." The differences between this plant and *P. Serraria* L. are fully discussed in the 1911 *Report*; and a Latin description of the new variety (which, however, was written *Sabrinæ*, as if a personal name) is given on p. 29. Having seen this Plantain both in its original station and on rocks at the end of the Brean Down peninsula (just opposite), where one woody root produced six flowering branches and found it true under cultivation, I can fully endorse Mr. Druce's opinion. It may be useful to call attention to his having given it specific rank—a fact which I had overlooked until he reminded me of it. The whole appearance of the plant is extremely striking and distinct. It probably occurs on Lundy Island, v.c. 4 N. Devon, and should be found on rocky cliffs in Wales, &c.—EDWARD S. MARSHALL.

VERONICA CRISTA-GALLI AS AN ESCAPE FROM CULTIVATION. Mr. S. T. Dunn states in his *Alien Flora* that this distinct *Veronica* is "known as an escape more or less established in a few localities," but gives no further particulars. In one of my short walks around the boundaries of Barrow Hill, Henfield, Sussex, about the middle of March, my attention was attracted by a long band of a very small-flowered Veronica. As it was new to me I submitted specimens to my friend Mr. S. A. Skan, of the Kew Herbarium, who furnished me with its name and some particulars of its history in horticulture. It is recorded in Paxton's *Botanical Dictionary*, under the name of *Diplophyllum veronicæforme*, as having been introduced in 1813, and there is a specimen in the Kew Herbarium labelled "Herb. Hook.; Hort."; but no record of its having been cultivated at Kew has come to light. It is a native of the Caucasus, Transcaucasia, and North-eastern Persia, and belongs to a small section of the genus characterised by having the calyx-segments connate in pairs. *V. Griffithii* Benth., a native of Afghanistan, and *V. cardiocarpa* Walp., from the region of the Alatau Mountains, Central Asia, are the only other species of the section. *V. Crista-galli* is a slender monocarpic plant, slightly branched, with strongly ribbed leaves, similar to those of *V. montana*. The flowers are solitary, axillary, $\frac{1}{10}$ to $\frac{1}{8}$ inch in diameter, blue; the calyx enlarges in fruit, becoming similar to that of *Rhinanthus Crista-galli*. At Henfield it is doubtless an escape from the garden of William Borrer, a prominent British botanist of his day and a friend of Joseph Woods, Sir William Hooker, Dawson Turner, and others. The plant is now growing in great profusion alongside, within and without, the open iron fence skirting the south side of the grounds of Barrow Hill, by the pathway leading to the Lydds from the cedar grove. For nearly forty yards in length it has almost complete possession of the soil, covering it with a dense growth of soft green, prominent at a distance.—W. BOTTING HEMSLEY.

SWARTZIA MONTANA Lindb. IN SURREY. Miss G. Lister gathered this moss in fruit on mortar of the brick wall of a bridge near Witley, Surrey, in April of this year. According to the *Moss Census Catalogue*, Monmouth, Hereford, and Derby are the nearest counties from which it has hitherto been recorded. Its appearance in Surrey can hardly be considered anything but sporadic, and it is remarkable that it should be fruiting in what one would think so uncomfortable a situation for a moss which is at home in the crevices of mountain rocks, and perhaps most common in the Arctic regions. Roth states that it occasionally descends to the plains, as "bei Seeheim in der Bergstrasse, Hessen." The adaptability thus displayed is perhaps the reason why it has attained so wide a geographical distribution; it is found from 11,000 ft. alt. to near sea-level (in the present case), and from very high latitudes in the Arctic to Algiers and Abyssinia; it ranges over nearly the whole of the North Temperate Zone, and also occurs in New Zealand. Its appearance in Surrey is very noteworthy.—H. N. Dixon.

Veronica polita Fr. (Nov. Fl. Suec. p. 2, 1814). In the *London Catalogue*, ed. 10, and in Mr. Druce's *List*, this name is replaced by *V. didyma* Ten. (1811). In his *Mantissa* III, p. 169, Fries strongly protested against that identification:—"My plant is absolutely *V. agrestis* Tenore; as is proved by specimens from his own hand, and from Professor Wahlberg, who gathered it in Tenore's company. The description of *V. agrestis* Tenore v.c. [vidi cultum ?] in Fl. Med. Univ. so clearly exhibits all the marks of *V. polita*, that not even the slightest doubt can be fairly raised about its being a synonym. What *V. didyma* Tenore may be, I cannot so fully show (his cultivated specimens seen by me belong to *V. opaca*, as Reichenbach has already pointed out); but, as it is diagnosed by "calyces leaf-like, toothed, much larger than the corolla," it can by no means be referred to *V. polita*, but, word for word, exactly tallies with *V. agrestis* var. *calycida*, *Nov.* l. c. [p. 2] (*V. calycida* being wrongly indicated as having been put forward by me as a species): and, as the latter is more like *V. polita* than *V. agrestis* in its ovate shining leaves, and has often been sent by the most acute botanists for *V. polita* (Reichenbach, too, separates it from *V. agrestis*, and refers it to *V. polita*), no doubt, to my mind, remains that the name of *V. didyma* has been transferred to *V. polita* by a similar confusion" [translated from the Latin]. In face of such a detailed refutation, it seems unadvisable to displace *V. polita* Fr., about which there is no uncertainty.—Edward S. Marshall.

REVIEW.

Einfluss der Kultur auf die Flora in den gegenden nördlich vom Ladogasee.—I. General Section: 430 pp., with 6 woodcuts, 6 tables, and 20 maps. By K. Linkola (Acta Soc. Fauna et Flora Fennica, 45, n. 1. Helsingfors, 1 April, 1916).

The waters of Lake Ladoga wash the south-east borders of the recently established Republic of Finland. No less than seventy rivers flow into and out of this immense lake, which communicates with the open sea of the Gulf of Finland by the broad channel of the Neva on its south (Russian) side. The region north-west of the lake is the most fertile tract in Finland, and the leading crops in the order of their importance include rye, barley, oats, and potatoes.

The district which forms the subject-matter of this elaborate memoir lies between 61° 15′–62° 25′ lat. and 30° 15′–32° 50′ long. Its greatest length is about 135 kilometres from west to east, and its breadth is 130 kilometres from south to north, embracing the greater part of the lan of Nyland and a small portion of the lan of Viborg. The superficial strata are formed chiefly of schist and gneiss, and have a varied flora associated with its cultivated soil. The area is fairly populated (for Finland), with about 15 persons to the square kilometre.

In the course of eleven chapters (or sections) the subject-matter is treated with a thoroughness unusual in such memoirs, which one formerly associated with German methods of investigation, until analysis showed to what extent German monographs are infarcted to stodginess with redundant descriptions, repetitions, plagiarism, and rounding off. The subjects consecutively dealt with include: hydrography, climate, agricultural industry, crops, cultivated plants, natural plant-associations (in forests, on moorland, on rocks and stony soil, banks and slopes, and aquatic), artificial and cultivated plant-associations, and the semi-natural plant-associations of field-borders, roadsides, and the neighbourhood of dwellings, hemerophilous plants, hemerodiaphorous plants, hemerophobous plants, the relative statistics of anthropocorous species and apophytes, virginal and sterile forms in the natural state and when associated with crops and imported grain, the parasitism of cryptogamic plants on both native flowering plants and on crops, and lastly the influence of cultivation on the relative distribution and modification of all these controlling factors. All this is discussed with the cosmopolitan detachment of mind which the man of science concentrates on his limited subject in the course of original research—even in the reign of Armageddon!

The list of authors cited occupies thirteen pages—mostly Swedish, Finnish, and German. Only a single English work is cited, Watson's *Cybele Britannica*—though another is quoted secondhand from a notice in the *Botanisches Centralblatt*.

As an instance of the critical grouping of Anthropochorous species, among those which are more or less widely distributed through *all* the cultivated areas are: *Poa annua*, *Silene inflata*, *Dianthus deltoides*, *Stellaria media*, and *Alchemilla pastoralis*. Among those whose natural extension and increase seem to be restricted by the incursion of cultivation, sometimes even choking them out, are: *Alopecurus pratensis*, *Urtica urens*, *Spergularia campestris*, *Scleranthus annuus*, *Silene dichotoma*, and *Brassica arvensis*.

The Natural History Society of Helsingfors, founded in 1848, began with the modest *Notiser*, followed by the more ambitious *Acta* in 1875. Through its channels have issued most of the good scientific work, or rather the account of it, undertaken by the naturalists of Finland, who have contributed no small part to the study of European Natural History. The present memoir, which will probably in due course be followed by the "Special Section," will together form an excellent sample of the scientific work of Finnish naturalists. With the fuller scope for the freer exercise of its many activities by a country liberated from the trammels of an imperial autocracy or the equally repressive tyranny of an amorphous democracy, there is much hope in the future for the small band of workers devoted to the advancement of Science.

Frederic N. Williams.

BOOK-NOTES, NEWS, ETC.

The *Flora of Epsom and its Neighbourhood*, by the Rev. T. N. Hart Smith-Pearse, 1917 (Epsom: L. W. Andrews & Son, 3*s*. 6*d*. net), is a summary of the work carried out by the Epsom College Natural History Society since 1889, largely augmented by personal observations by the compiler. As the majority of the records were noted during excursions in Term time, some species have been missed that flower in the Easter and summer vacations, and many of the more critical plants are omitted as outside the scope of the work. A special feature is the exact date of the first flowering for each species, extendng over a period of twenty-five years; it would be interesting to compare these with similar observations in Northern England or Scotland. A clearly-printed map (2 miles to 1⅝ in.) indicates the area included in the Flora, which is roughly a parallelogram with the corners at Cobham, Wallington, Redhill, and Gomshall; thus its northern boundary is only a mile or so above Epsom and the main area chiefly southwards. In an Appendix, botanical extracts are given from a *History of Epsom* by 'an Inhabitant' [Henry Pownall], published in 1825, but we think this work has been taken rather more seriously than it deserves. For example, Mr. Smith-Pearse quotes *Alchemilla alpina*, *Althæa officinalis*, *Euphorbia Peplis*, *Lagurus ovatus*, *Scrophularia Scorodonia*, etc. with the remark, "never seen at present"; the last two words might, we think, be omitted should another edition be required, in which case an index should certainly be added.

As is well known to botanists, there is in the herbarium of Prince Roland Bonaparte at Paris a large collection of ferns, including the very important herbarium of Dr. H. Christ of Basel. The Prince has sent us a set of his *Notes Ptéridologiques* (Fasc. I.–IV. Paris, 1915–17, published by the author) and some papers on African and Indian forms. The object of the 'Notes' is partly to indicate his desiderata, and partly to give the public the benefit of the determinations made of unnamed specimens in his own herbarium and in collections which have been entrusted to him for naming. It is interesting to see that names have been fitted to some of the hitherto undetermined specimens in such well-known numbered series as

Spruce's South-American ferns. The lists of determinations in the 'Notes' are arranged geographically, and though often fragmentary are likely to be of considerable help to the working student, but their value would be much enhanced by the addition of a specific index to each fascicle, and by headings to the pages. Presumably it is intended eventually to publish a general index to all the fascicles; but meanwhile the lack of it is a great inconvenience. A number of new species and varieties are described, and a new genus is republished; without an index these are liable to be overlooked.—A. G.

The *Proceedings of the Liverpool Botanical Society for 1912–1915*, published in November last, shows a gratifying amount of activity in excursions and indoor meetings, of both of which accounts are included. A summary is given of the progress made in the investigation of the South Lancashire Flora.

The *Journal of the Linnean Society* (xliv. no. 295, dated Nov. 27, 1917) contains a "Quantitative Description of the British Species of *Mnium*" by Prof. Julius MacLeod, of the University of Ghent, and a paper on "The Heterangiums of the British Coal Measures," by Dr. D. H. Scott, of which a summary will be found in this Journal for 1917, p. 164.

The Council of the Essex Field Club appeals for help towards a fund for providing a pension for Mr. William Cole. The Club was founded through Mr. Cole's efforts in 1880, and he has acted ever since (that is, for thirty seven years) as its principal Honorary Secretary, as Editor of its publications, and as Curator of its two Museums. He now finds himself, at the age of seventy-two, in straitened circumstances, suffering from grave physical infirmities, and compelled to resign the Curatorship, which afforded the sole income on which he, and others dependent on him, subsisted. Contributions should be addressed to the Hon. Treasurer of the Club, Mr. John Avry, 52 Coleman Street, E.C. 2.

We have received the following notice:—"A la suite du décès de Madame C. Barbey-Boissier, ses six enfants ont l'honneur d'informer MM. les correspondants de l'Herbier Boissier qu'ils remettent les collections botaniques et la bibliothèque de cet Herbier en donation à l'Université de Genève. Ils ont pris leurs dispositions pour que tous ces documents demeurent accessibles aux savants suisses et étrangers, M. Gustave Beauverd, Conservateur de l'Herbier Boissier, étant attaché à cet effet dès le 1^er^ Avril 1918 au Laboratoire de Botanique de l'Université de Genève."

The Kew *Bulletin* issued last month (1918, nos. 2 & 3) is mainly occupied by an important and exhaustive monograph of the genus *Chrozophora*, by Sir David Prain. The paper is divided into various sections, dealing respectively with the history of the genus—an admirable example of literary and historical research; the characters of the genus; the history of the species under *Croton* (from which it was separated by Necker in 1790); the history of the species, 1826–64; the treatment of the genus in De Candolle's *Prodromus*; the history of the African species (1767–1912), of the Indian species (1869–1906), and of the Oriental species (1879–1915); the species in Engler's *Pflanzenreich*; concluding with a systematic synopsis, in which eleven species with numerous varieties are described at length, with the fullest synonymy, geographical distribution, etc. The monograph is in every way a perfect example of what such things should be: the only possible improvement would be the addition of an index and table of contents, neither of which would add greatly to the space occupied; the utilization of page-headings, to which we referred last year (Journ. Bot. 1917, 289), would have rendered the paper more readily consultable. Government departments are sometimes accused of giving insufficient support to science: Sir David Prain is to be congratulated on having, in these days of paper shortage, secured from the Stationery Office a pamphlet of a hundred pages issued to the public at the nominal cost of fivepence.

The *New Phytologist* for January and February (published March 11) contains, under the heading "The Examination of a Witness," an amusing and acute criticism of the paper on "The Reconstruction of Elementary Botanical Teaching," published in the same periodical for December last over the names of five botanists referred to by the anonymous critic as "The Five Wise Men." Mr. James Small continues his essay on "The Origin and Development of the *Compositæ*," and Mr. J. W. Hornby describes and figures *Endoderma Cladophoræ*—a new fresh-water alga epiphytic on *Cladophora glomerata* from a well in Sutton Park, Warwickshire.

Dr. F. E. Weiss sends us a reprint, from the Annual Report of the Manchester Microscopical Society, 1916, of his Presidential Address (delivered Feb. 8, 1917) on "Seeds and Seedlings of Orchids," which deals with the dependence of Orchid seeds for their germination upon the intervention of a fungus.

During his stay in England in 1914–15, Mr. S. F. Blake made an exhaustive study of the Clayton Herbarium, now incorporated in the National Herbarium. As is well known, Clayton's collection forms the basis of Gronovius's *Flora Virginica* (ed. 1, 1739–43; ed. 2, 1763), and incidentally of the North-American plants described by Linnæus in the *Species Plantarum*, to whom Gronovius sent specimens from Clayton. Although Clayton's plants have frequently been consulted by American and other workers, no systematic examination of the whole collection has hitherto been made; and Mr. Blake is now publishing in *Rhodora* the results of his investigations. We shall probably refer again to these when the series is completed.

An appeal has been issued for funds to perpetuate the memory of the late Ethel Sargent's connection with Girton College by creating a Girton Fellowship for original work in Natural Science and especially in Botany. Subscriptions may be sent to Miss E. Lawder, 25 Halifax Road, Cambridge.

THE SUMATRAN SPECIES OF SAURAUJA.

By Edmund G. Baker, F.L.S.

Korthals in 1839–42 in Verh. Nat. Ges. Bot. described six species of *Saurauja* from Sumatra: Miquel 1862, in Fl. Ind. Bat. Suppl. enumerated fourteen then known to him as occurring in this island, but later in 1868–69 in Ann. Mus. Bat. vol. iv. he reduced several of these to forms of other species.

In the present paper I have included three novelties founded on O. Beccari's "Piante Sumatranæ" named in MS. by Dr. O. Stapf in the Kew Herbarium, and I am indebted to Mr. H. N. Ridley for the descriptions of the plants collected on the Korinchi Expedition by Messrs. Robinson and Kloss. I have also endeavoured to determine the species and describe the novelties collected in Sumatra by Dr. H. O. Forbes, thus raising the number for the island to twenty-five.

The division of the genus into sections or groups is a matter of considerable difficulty. Choisy in his *Mémoire sur les Ternstrœmiaceæ* (1855) placed the species with 5 styles in *Saurauja* and those with 3 in *Scapha*; but the styles sometimes vary in number in one and the same individual. Dr. Gilg in Engler's Nat. Pflanzenfamilien (iii. 6. 126) divides the genus into two sections—Paniculatæ and Fasciculatæ, according to the character of the inflorescence; but there is every possible gradation between such plants as *S. paniculigera* Ridley with a lax panicle and *S. tristyla* DC. and *S. dempoensis* mihi with flowers in fascicles. It therefore seems advisable to attempt a division into a number of smaller series.

Except where otherwise stated, the types of the new species described are in the National Herbarium.

Series 1. Flores paniculati, numerosi. Calyx glaber, margine ciliata. Folia majuscula, elliptico-obovata. Styli 5.

1. S. paniculigera Ridley, in Journ. F.M.S. Mus. viii. pt. iv. 19. *Arbor* mediocris, ramis infra lævibus glabris, superne partibus juvenibus trichomatibus crassiusculis tectis. *Folia* apice breviter subacuta, basi breviter angustata, obtusa vel rotundata, marginibus breviter dentatis, spinulis pallidis in dentibus, supra glabra lævia, subtus glabra, nervis horizontalibus elevatis usque ad 18 paribus, 18–30 cm. longa, 9·5–15 cm. lata, petiolo 3–6·5 cm. longo. *Panicula* 15 cm. longa, 8 cm. lata, in ramis multiflora, laxa, ramis trichomatibus tectis. *Flores* albi, pedicellis 2 cm. longis. *Bracteæ* parvæ, caducæ. *Sepala* 2 exteriora ovata, interiora 3 tenuiora orbiculata, coriacea, glabra. *Corolla* 2·5 cm. lata, petalis oblongis apicibus rotundatis bilobis. *Stamina* ad 21, filamentis subulatis, antheris parvis oblongis. *Ovarium* late rotundatum, glabrum.

Korinchi Peak, alt. 7300, *R. & K.*!

II — Series 2. Flores in fasciculis plurifloris in trunco et ramis. Sepala exteriora hirta. Folia coriacea, oblonga. Styli 3 dimidio connati.

2. S. CASTANIFOLIA Ridley, *l. c.* 20.

Arbor. Folia apice cuspidata, basi rotundata, serrata, spinulis in dentibus, supra glabra, subtus trichomatibus in costa, brevioribus in nervis, minimis sparsis in nervulis et reticulationibus, nervis 16 subtus elevatis adscendentibus, superne depressis, 21 cm. longa 6·5–8 cm. lata, petiolo crassiusculo 3·5 cm. longo. *Sepala* exteriora lanceolata, acuta, 6 mm. longa. *Corolla* basi connata 1·5 cm. lata, petalis oblongis, apicibus rotundatis emarginatis. *Stamina* 12 filamentis linearibus, antheris prope basin flexis oblongis.

Siolah Dras, alt. 3000 ft., *R. & K.*!

The flowers, borne on the stem, are distinctly smaller than in allied species; the sepals and pedicels are covered with mossy hairs.

III — Series 3. Flores parviusculi, numerosi, ex ligno vetere orti. Sepala glabra vel glabriuscula. Folia oblongo-obovata. Styli 3.

3. S. XYLANTHA Stapf MS. in Hb. Kew.

Arbuscula. Folia membranacea, margine serrata, lamina 17–19 cm. longa, 6·5–8·5 cm. lata, petiolo 15–25 mm. longo instructa. *Flores* in nodositates glomerati, pedicellis emarcidis persistentibus intermixti. *Sepala* ± 5 mm. longa, concava. *Petala* staminaque delapsa. *Ovarium* 3-loculare.

Prov. Padang, *Beccari* 780! Hb. Kew.

Allied to *S. cauliflora* DC.

Forbes 2130 is closely allied to this.

IV — Series 4. Flores in cymas pedunculatas dispositi. Sepala exteriora demum fere glabra. Folia ovalia, basi subcordata. Styli 5.

4. S. VULCANI Korth. Verh. 128; Miq. Ann. Mus. iv. 108. *S. polyantha* De Vriese, Pl. Ind. Or. 36.

Mt. Merapi, *Korthals*! Hb. Kew. Mt. Singalan, *Beccari* 196! Hb. Kew.

Forma *setidens* Miq. Fl. Ind. Bat. Suppl. 481 pro sp.

Near Lubo sampit, *Teysmann*.

V — Series 5. Pedunculi pluriflori, rarius uniflori. Sepala exteriora setosa.

a. Folia oblonga vel obovato-oblonga. Styli 4–5. Pedunculi sæpissime pluriflori.

5. S. REINWARDTIANA Bl. Bijdr. 123; Miq. Ann. Mus. iv. 110.

Sandaran Agong, Korinchi, *R. & K.*! Siolah Dras, Korinchi, alt. 3000 ft., *R. & K.*!

Tree with white flowers and reddish-pink hairs.

b. Folia anguste lanceolata. Styli 5. Flores singuli, axillares.

6. S. AURICOMA Ridley, *l. c.* 18.

Siolah Dras, alt. 4400 ft., *R. & K.*!

Arbor parva, ramis gracilibus dense velutino-hirtis trichomatibu longioribus intermixtis. *Folia* basi paullo angustata obtusa, tenuiter coriacea, supra glabra, marginibus minute crenulato-serrata, spinulis appressis, subtus costa velutino-hirta, nervis elevatis 14 paribus tenuibus adscendentibus cum reticulationibus et nervulis trichomatibus tectis, 9–15 cm. longa, 2–3 cm. lata, petiolo velutino hirto 1 cm. longo. *Sepala* ovata, acuta, trichomatibus longis tecta, 1 cm. longa. *Petala* basin connata, lobis oblongis rotundatis integris. *Corolla* alba, 2·8 cm. lata. *Stamina* 26. Antheræ breves, recurvæ, obtusæ. *Ovarium* oblongum, glabrum.

Allied to the preceding but with narrow leaves glabrous above, and a different indumentum—short hairs very close and velvety, in which are interspersed the longer trichomes.

S. angustifolia Ridley, *l. c.* 19, is very closely allied.

c. Folia obverse sublanceolato-oblonga. Styli 5. Pedunculi pluriflori.

7. S. SINGALANGENSIS Korth, Verh. 134; Miq. Ann. Mus. iv. 109.
Near Alahan Pandjang and Mt. Singalan, *Teysmann*.
Probably also Mt. Singalan, *Beccari* 95 & 131! Hb. Kew.
Very closely allied to *S. ferox* Korth.

d. Folia oblongo-ovalia. Styli 3–4. Pedunculi sæpissime pluriflori.

8. S. FEROX Korth. Verh. 132, t. 19; Miq. Fl. i. 2, 482.
Prov. Priman.

β. ANGUSTIOR Miq. Fl. Ind. Bat. Suppl. 480.
Palembang, *Teysmann*.

e. Folia latiora, obovata, cuspidata. Styli 5. Pedunculi pluriflori.

9. S. CUSPIDELLA Miq. Ann. Mus. iv. 108. *S. ferox* Korth. v. *latifolia* Miq. Fl. Ind. Bat. Suppl. i. 480.
Prov. Priman, *Diepenhorst*.
Sungei Kumbang, Korinchi, *R. & K.*! Siolah Dras, *R. & K.*! Lake Raman, *Forbes* 2127! & 2137! Mt. Besagi, *Forbes* 2054! Shrub 5 ft.
Prov. Padang, *Beccari* 715! Hb. Kew, Mus. Brit.

f. Folia obovata, acuminata. Styli 5. Pedunculi sæpissime pluriflori.

10. S. SETIGERA Korth. Verh. 133; Miq. Ann. Mus. iv. 108.
Melingtang, *Korthals*! Hb. Kew.

Miquel in Ann. Mus. iv. 108 reduces his *S. polytricha* to this species as a form differing in the leaves being more narrow towards the base.

g. Folia elliptica, acuminata. Styli 5. Pedunculi sæpissime pluriflori.

11. S. DASYANTHA De Vriese, Pl. Ind. Or. 49.
Sumatra, *Junghuhn*.
The plant from the foot of Mt. Kala (*Forbes* 2848!) should probably be referred here.

SERIES 6. Pedunculi sæpe 3-flori, bracteati. Bracteæ conspicuæ. Sepala exteriora setosa. Folia oblonga, acuminata. Styli 5. VI

12. S. HIRTA Bl. Bijdr. 128; Miq. Ann. Mus. iv. 111.
Mt. Besagi, *Forbes* 2054!

II SERIES 7. Flores majusculi. Pedunculi longiusculi, cymoso-fasciculato, 3–7-flori. Bracteæ conspicuæ. Sepala fusco-setosa. Folia majuscula, elliptica vel elliptico-ovata. Styli 5 ad basin connati.

13. **S. Forbesi** mihi, sp. nov.

Arbuscula 8–10 metr. alt. *Ramuli* sub lente strigoso-setosi. *Folia* majuscula, subcoriacea, supra fere glabra, margine denticulata, nervis lateribus ± 15 apice rotundata, basi subcordata vel rotundata, lamina 22–25 cm. longa, 12–14·5 cm. lata, petiolo 5–7 cm. longo instructa. *Pedunculus* communis subcompressus, 8–9 cm. longus. *Bracteæ* conspicuæ. *Sepala* ± 9 mm. longa. *Petala* delapsa. *Ovarium* pubescens.

Slopes of volcano, alt. 3500 ft.! Mt. Dempo, Passoemah, *Forbes* 2325!

"A small tree with white flowers and fruit green when gathered."

Allied to *S. bracteosa* DC., but differs by the longer almost glabrous petioles etc. *Forbes* 2335 *a* & 2205 are closely allied, but the leaves are smaller.

III SERIES 8. Pedunculi pauciflori. Bracteæ parvæ. Sepala exteriora scabrida. Folia papyracea, elliptica vel elliptico-ovata. Styli 5 e basi liberi.

14. **S. sumatrana** mihi, sp. nov.

Arbuscula. Ramuli novelli scabridi. *Folia* apice acuminata, basi rotundata, nervis lateralibus 10–13, lamina 10–20 cm. longa, 5·5–8·0 cm. lata, petiolo 15–25 mm. longo instructa. *Pedunculi* scabridi, 2·5–7·0 cm. longi, pedicellis 8–10 mm. longis. *Sepala* exteriora 11–13 mm. longa. *Petala* delapsa. *Ovarium* glaberrimum, 5-loculare.

A small tree with papyraceous leaves, elliptical or elliptical-ovate, and few-flowered peduncles. Allied to *S. Reinwardtiana* Bl., but the leaves are not so narrowed towards the base, and the exterior sepals are ovate-orbicular and scabrid externally.

Goenoeng Tengamoes, Lampongs, *Forbes* 1840!

IV SERIES 9. Paniculæ extra axillares, paucifloræ. Sepala orbicularia, coriacea, parce ad margines ciliatæ. Folia crasse coriacea, oblonga, subtus ferrugineo-furfuracea. Styli liberi ad basin.

15. S. SAPOTOIDES Ridley, *l. c.* 19.

Arbor parva, ramis validis partibus juvenibus subfurfuraceis. *Folia* apice breviter subacuta, basi lato, marginibus serrulatis, supra nitida, nervis prominentibus 40 horizontalibus, 15–19 cm. longa, 7 cm. lata, petiolo 3–4 cm. longo. *Paniculæ* 3–4 cm. longæ. *Corollæ* lobis brevibus integris rotundatis. *Stamina* 25, filamentis brevibus linearibus, antheris brevibus subreniformibus. *Ovarium* glabrum, subglobosum.

Korinchi, *R. & K.*

A curious species with stiff oblong leaves red beneath, and small flowers having the appearance of a *Bassia*.

Series 10. Pedunculi elongati, axillares, sæpius 2–3-flori. Calyx glaber. Folia oblongo-obovata. Styli 5.

16. S. PENDULA Bl. Bijdr. 127; Miq. Ann. Mus. iv. 110.

Sungei Kumbang, Korinchi, alt. 4500 ft., *R. & K.* 146! Hb. Mus. Brit.

Flowers deep pink. Large tree.

Series 11. Flores magni, sæpissime solitarii. Calyx glaber. Folia oblongo-obovata. Styli 5.

17. S. NUDIFLORA DC. var. nov. SUMATRANA.

Arbor vel arbuscula. Folia fere glabra, margine serrata, quam iis typi minora et magis obovata, lamina 10–15 cm. longa, 5–9 cm. lata, petiolo 12–20 mm. longo instructa.

Sepala 10–11 mm. longa. *Styli* ad basin connati. *Ovarium* demum glabrescens.

Gunong, Lampongs, *Forbes* 1480! tree 18–20 ft.; on Mt. Dempo, Passoemah, *Forbes* 2527! a large tree with prominent rough veins and midrib. Flowers white. Mt. Besagi, *Forbes* 2054! Shrub 5 ft. Also probably Hoedjong, Lampongs, *Forbes* 2053 *c*.

Differs from the type as figured by De Candolle in Mem. Soc. Phys. Génève, i. t. v., by the shorter more distinctly obovate leaves, with a more distinctly cuneate base.

Series 12. Flores fasciculati. Folia elliptica vel ovata, subtus rubiginosa. Styli 3.

18. S. JACKIANA Korth. Verh. 127. *Ternstrœmia rubiginosa* Jack.; DC. Prod. i. 524; Hook. Bot. Misc. ii. 83.

Mt. Singalan, *Korthals*! Prov. Padang, *Beccari* 669! Hb. Kew.

Series 13. Flores fasciculati vel solitarii. Sepala glabriuscula. Folia elliptico-lanceolata, acuminata. Styli 3.

19. S. LEUCOPHLOIA Korth. Verh. 125; Miq. Ann. Mus. iv. 107.

Mt. Singalan, *Korthals*! Hb. Kew.

Forma *b.* LONGIFOLIA Miq. Ann. Mus. iv. 107. *S. Teysmanniana* Miq. Fl. Ind. Bat. Suppl. 451.

Near Lulu Alang, *Teysmann*.

Forma *c.* OXYPHYLLA Miq. Ann. Mus. iv. 107. *S. oxyphylla* Fl. Ind. Bat. Suppl. 480.

Near Lulu Alang, *Teysmann*.

Series 14. Flores parvi, fasciculati, rarius solitarii. Sepala exteriora glabra vel minute squamulosa. Styli 3.

a. Folia glabra, oblongo-obovata vel elliptico-oblanceolata.

20. S. TRISTYLA DC. var. nov. SUMATRANA.

Arbor vel frutex. Folia quam iis typi minora at basin versus aliquid magis angustata, a medio deorsum cuneata. *Flores* parvi ad nodositates ramorum fasciculati. *Pedicelli* graciles, demum glabri. *Sepala* exteriora glabra vel fere glabra ± 4 mm. longa. *Styli* 3 ad basin liberi.

Tandjong, *Forbes* 2822! a large tree; Tandjong Ning, *Forbes* 2802 *a*! large shrub.

I have compared this with the true *S. tristyla* figured by De Candolle, *l. c.* tab. vii.: the leaves are smaller, and the pedicels almost glabrous not squamulose.

b. Folia aspera, oblanceolata.

21. S. ASPERIFOLIA Stapf MS. in Hb. Kew.
Mt. Singalan, *Beccari* 368! Hb. Kew & Mus. Brit.

Ramuli pilis asperis vestiti. *Folia* petiolata, oblanceolata, apice subacuminata, deorsum cuneata, margine serrata, præcipue subtus aspera, nervis lateralibus numerosis arcuatis, lamina 15–20 cm. longa, 5–5·5 cm. lata, petiolo pilis asperis vestito et 3–4 cm. longo suffulta. *Flores* inter minores, fasciculati. *Pedicelli* graciles, pilis asperis vestiti. *Sepala* exteriora pubescentia, ovata, 4–5 mm. longa.

Noticeable on account of the rough oblanceolate petiolate leaves, and small fasciculate flowers with three styles.

c. Folia utrinque pilis plus minus vestita, oblongo-oblanceolata.

22. S. PUNCTATA Stapf MS. in Hb. Kew.

Rami cortice cinereo obtecti. *Folia* apice acuminata, basi cuneata nervis lateribus utrinque ± 10 arcuato-adscendentibus, lamina 11–14 cm. longa, 4–6 cm. lata, petiolo 12–20 mm. longo prædita. *Flores* parvi ex nodositates ramulorum orti. *Pedicelli* pubescentes, bracteolis minimis suffulti. *Sepala* ± 4 mm. longa. *Ovarium* 3-loculare, pubescens.

Mt. Singalan, *Beccari* 98! Hb. Kew.

This and the preceding species are allies of *S. tristyla* DC. Both have smaller leaves than the true plant, and differ because the leaves of *tristyla* are glabrous.

d. Folia ovata vel oblongo-ovata.

23. S. MEDIA Korth. Verh. 125; Miq. Ann. Mus. iv. 107.
Mt. Singalan, *Korthals*! Hb. Kew.

Miquel in Fl. Ind. Bat. Suppl. described *S. inflexidens*, but he subsequently referred both this species and *S. camptodonta* to forms of *S. media* Korth.

e. Folia glabra, oblonga, elongata.

24. **S. dempoensis** mihi, sp. nov.

Arbuscula. Ramuli validi, fere glabri. *Folia* majuscula, glabra, subtus pallidiora griseo-cinerea, margine serrata, nervis lateralibus numerosis supra inconspicuis subtus elevatis, apice acuminata, basi cuneata, lamina 20–28 cm. longa, 5–6 cm. lata, petiolo glabro 15–25 mm. longo suffulta. *Flores* parvi, rosei, ex nodositates ramulorum fasciculati. *Pedicelli* graciles, squamulosi. *Sepala* exteriora squamulosa, concava, 5 mm. longo. *Styli* 3. *Ovarium* globosum.

Mt. Dempo, alt. 5300 ft., *Forbes* 2262!

A near ally of *S. tristyla* DC.: differs in the narrower, more elongate, and more markedly serrate leaves, which when dried are pale ashen-grey below.

SERIES 15. Flores parviusculi, fasciculati, in axillis foliorum supremorum dispositi. Sepala exteriora, setoso-hispidissima. Folia oblongo-lanceolata. Styli 3.

XV

25. **S. trichopoda** mihi, sp. nov.

Arbuscula erecta. *Ramuli* novelli setoso-hispida. *Folia* apice acuminata, basi cuneata, margine serrata, supra glabra, subtus præcipue ad costam nervosque plus minus setoso-hispida, lamina 16–22 cm. longa, 5·5–7·0 cm. lata, petiolo mediocri setoso-hispido 25–37 mm. longo instructa. *Pedicelli* setoso-hispidissimi usque ad 2 cm. longi. *Sepala* 7–9 mm. longa. Styli usque ad basin liberi. *Ovarium* ± hirsutum.

Noticeable on account of the oblong-lanceolate acuminate leaves, with setose-hispid petioles, and axillary fasciculate flowers with setose-hispid sepals and pedicels.

Groenoeng Trang, *Forbes* 1468!

A plant in the Kew Herbarium named *S. lanceolata* bears considerable resemblance to this, and is quite distinct from the true *S. lanceolata* as figured by De Candolle in Mem. Soc. Génève, i. tab. iv.

Evidently allied to *S. squamulosa* Koorders & Valeton, a plant only known to me from the description.

NOTES ON HIERACIA.

By the Rev. E. S. Marshall, M.A., F.L.S.

HIERACIUM CALLISTOPHYLLUM F. J. Hanb. Thirty years ago, when planning a solitary trip in Scotland, I was led, either by instinct or by "beginner's luck," to include Kingshouse, v.c. 98 Argyll, on the borders of Rannoch Moor, and just below the highest granitic hills of the great Black Mount deer-forest. This first short visit (followed by later and more thorough explorations) resulted in the discovery of several Hawkweeds new to science, besides adding the Scandinavian *H. submurorum* to our list.

H. callistophyllum, as its name implies, has very handsome foliage, the outer root-leaves being often almost balloon-shaped, with numerous large teeth in their lower half. A full description will be found in *Journ. Bot.* 1892, p. 168. Usually it grows on granite or mica-schist, having a preference for rocky streamsides, between 2000 and 3000 feet; in Perthshire it occurs down to 1600 feet or less, and in its most northern station hitherto known (near Oykell Bridge, v.c. 106 E. Ross) I have seen it as low as 200 feet; but this is quite exceptional. In the Central Highlands one has found it rather well distributed; the southern limit appears to be in the hills near Moffat, v.c. 72 Dumfries.

Dr. Lindeberg's first comment was "*H. nigrescens*, forma!" (*i. e.* the "*nigrescens*" of Fries and Backhouse, which is *H. curvatum* Elfstrand). Later on, he returned specimens in a "*murorum*" cover (aggregate *H. silvaticum* Gouan); but he also saw in it some affinity with *H. submurorum*. Dr. Elfstrand remarked (1894) on specimens in Herb. Hanbury :—"This is a very good species, most nearly allied to *H. iricum* Fr., which Fries referred to the section *Cerinthoidea*. No species of this form in Scandinavia." Most certainly this was wide of the mark; even alpine states of *iricum* differ widely from it, especially in having several stem-leaves, gradually decreasing in size upwards. W. R. Linton, in *The British Hieracia* (1905), p. 36, placed it as his first species in *Vulgata*, Group i. *Silvatica*—a classification which I was never able to accept.

Recent careful comparison has convinced me that its proper place is among the less glandular series of the § *Alpina Nigrescentia*, and that *H. Marshalli* Linton is its closest ally. The leaves usually have some small marginal glands (a characteristic feature of the *Alpina*); and the other characters fit in best with this section. Connecting-links are to be found in vars. *glandulosum* (which is, practically, a very dark and glandular-headed *Marshalli*) and *cremnanthes*, especially the latter; but I have not the slightest hesitation in placing both under *H. Marshalli*, as was done by Mr. Hanbury, when describing them.

Hieracium scanicum Dahlst. Plants gathered by me in June, 1898, on sandy railway-banks between Brookwood and North Camp, W. Surrey, v.c. 17 (No. 2131), and on sandy ground and hedgebanks about Fleet, v.c. 12 N. Hants (No. 2130), are a very fine form of *H. scanicum*, practically identical with the Rev. Augustin Ley's Symonds Yat (v.c. 34 W. Gloster) specimens. To this species must also be referred a gathering (No. 2687) from Fittleworth, v.c. 13 W. Sussex, May to June, 1902. All three (*H. scanicum* not having, at that time, been identified as British) were referred to *H. surrejanum* F. J. Hanb., var. *megalodon* Linton; from which they differ in habit, foliage, and especially in the numerous black gland-tipped hairs of their phyllaries.

Hieracium hyparcticum (Journ. Bot. 1918, 90). Since my notice of its occurrence in Norway was written, a copy of Dr. Elfstrand's *Hieracia Alpina des mittleren Skandinaviens* (1893) has been given to me. On pp. 50 and 51 he described a new subsp. *wallboënse*, found in Jemtland, Sweden, near Wallbo, Åreskutan, and Rentjellet; as well as in Norway, near Kongswold, on the Dovre range. It differs from the type (Greenland; Scotland) in having involucres less glandular, and clothed with rather numerous simple hairs, with long, grey-tipped points. He thought that the Greenland *Hieracium*-Flora was probably derived from north-west Europe, having been conveyed by sea-currents or drift-ice; but it seems to me more likely that they are either circumpolar, or of North American origin.

Hieracium Leyi F. J. Hanb., var. vestitum Ley in W. Inverness. In 1916 I made two gatherings (Nos. 4327 and 4329) in Coire nan Gall, Laggan district, between 2000 and 2500 feet, which Rev. E. F. Linton agreed to as being an unusual form of *H. Leyi*, with remarkably dark, glandular, and hairy heads, pure yellow styles, and long-ciliate ligule-tips. These points all agree with the description of var. *vestitum* (Journ. Bot. 1911, p. 353); and they are even more marked in character than Ley's specimens from High Street, Westmorland, in my herbarium, which belong to this. Not previously known from Scotland.

THE RELATION BETWEEN GONIDIA AND HYPHÆ IN LICHENS.

By A. N. Danilov.

[The paper of which (by permission of the Director of the Imperial Garden) a translation follows was published in the *Bulletin du Jardin Impérial Botanique de St. Pétersbourg*, tom. x. livr. 2 (1910). The translation has been made by Messrs. R. Paulson and Somerville Hastings, who, while feeling that the importance of the paper justifies its publication in a language more generally understood by botanists than the Russian in which it originally appeared, are not to be understood as accepting all the author's conclusions. The original is accompanied by plates and figures, which it has not been thought necessary to reproduce.

Since the publication of the paper, Elfving has printed (Acta Soc. Sci. Fenn. xliv. no. 2: 1913) a further account of his investigations in which he supports his view that the gonidium of a lichen is genetically derived from the hypha.—R. P.]

The present paper was undertaken with a wish to throw some light on the interesting subject of the association of the alga and fungus in a lichen, for there has been some uncertainty regarding this matter. The chief aim has been to verify and explain those observations which led Prof. Elfving of the University of Helsingfors to revive the views of Wallroth on lichens.

In 1905 at the meeting of naturalists and doctors at Helsingfors, Elfving presented a report in which he maintained that the fungus and the alga in a lichen are not two independent organisms, as Schwendener declared, but two different stages of development of one and the same fungus. According to Elfving, the so-called algal portion differs from the hyphal part of the fungus in that the hyphæ undergo more or less complex changes. The hyphæ grow rapidly and throw out spherical cells, which, as they develop, resemble the cells of algæ more and more, in size and shape: later on these cells assume a green colour and finally break off entirely from the mother hyphæ. These separated greenish cells become the gonidia, and multiply by division within the thallus of the lichen. The process of separation of the gonidia from the hyphæ only takes place, according to Elfving, in the spring. Elfving carried out investigations on *Peltigera canina*, *Evernia*, *Parmelia*, *Ramalina farinacea*, *Usnea barbata*, *Lecanora peralbella*, *Cladonia rangiferina*, and on other lichens gathered in early spring, from which he obtained preparations for microscopical examination, which led him to these very definite conclusions. He exhibited his preparations after he had presented his report, and, according to the late Prof. M. S. Voronin, they certainly gave the impression that the hyphæ develop algal cells.

The question is one of extreme interest. Acting at the suggestion of A. A. Elenkin and with his closest assistance in the spring of 1909, I made observations with a view of explaining what Elfving had seen in his preparations, as he had apparently obtained a sufficient foundation for the publication of conclusions entirely opposed to the views on the nature of lichens strongly held since the time of Schwendener, viz. a fungus in symbiotic relationship with an alga.

Before we come to the explanation of the facts observed, it will not be superfluous to indicate the materials on which my investigations were made. From the 20th April to the end of May, material was being collected in the neighbourhood of St. Petersburg, and afterwards throughout the whole summer in the Vitebsk province—an interval of two weeks occurred between the former and the latter collections. The observations were made principally on *Evernia prunastri* and *E. furfuracea*. In addition, the following were also examined for purposes of comparison: *Parmelia sulcata*, *Ramalina farinacea*, *Usnea barbata*, *Cladonia rangiferina*, *Xanthoria parietina*, *Lecanora angulosa*, and also the separately growing *Chlorococcum*. Part of the material obtained was fixed, immediately after collection, in 75 °/₀ or in absolute alcohol.

The first observations were made on sections cut with a razor, both from fresh material and from that fixed in spirit. The material was prepared for examination by being put through absolute alcohol and xylol and was embedded in paraffin; the sections varied from 1 μ to 15 μ in thickness; the 1 μ sections were however unsatisfactory, but fully satisfactory results were obtained from the 2 μ sections. Some of the sections, stained and unstained, were examined in a liquid medium, water or glycerine. In such cases the following method was employed in every instance: the section was first examined as a whole, then broken up under a cover glass, by careful tapping and pressure, in order that the separate hyphæ and gonidia might be observed more minutely. Various stains were used—carmine, fuchsin, methyl green, methyl blue, safranin, hæmatoxylin. Of these the most suited to my purpose were a mixture of fuchsin and methyl green, made acid with acetic acid. During both staining and clearing, the preparations were kept on slides in beakers filled with the same solutions as those used for staining in bulk. I at first washed with spirit of a different strength, but found it very difficult to ascertain the precise moment at which to cease washing, for decolouration takes place very rapidly when the spirit is either too strong or too weak. Spirit greatly diluted with water I found impossible to use for the work, as the preparations would absorb too much water and become impossible to fix. For this reason I began to use a solution of glycerine in strong spirit. In this solution decolouration proceeds less rapidly and thus gives a better opportunity to cease washing at the moment when the differentiation of the various parts of the preparation has attained its greatest distinctness. The fixed sections were mounted in glycerine jelly and the unfixed ones in glycerine. The most interesting preparations were examined with a Zeiss apochromatic objective magnifying 1000 diameters.

The problems presented at the commencement of the work had to be divided as follows: 1. What is the nature of the gonidia? 2. How close is the relation between the hyphæ and the gonidia, and what is its character? 3. Is the point of view of Elfving in any way justified? 4. Do the hyphæ penetrate the algal cells, *i. e.* do they form what is known as haustoria? 5. What is the further development of the hyphal extensions after entering the gonidia, and what is the effect upon the gonidia of their invasion by the haustoria? The following results obtained from these investigations more or less answer the questions.

In a thin section, made from the living thallus, certain areas can be clearly distinguished in which chloroplasts are enclosed in an algal cell wall. Side by side with the normal spherical cells with a well-developed cup-shaped chloroplast can be seen pale green cells obviously differing from the normal. The character of these abnormal cells is seen in the paleness of colour, the contracted and deformed chloroplast, and even in the entire absence of contents, so that one sees even empty cellulose envelopes of these gonidia. I cannot consider this a normal condition of the cells which will be described as "pale gonidia." They have a protoplasmic structure from which chlorophyll is entirely absent; these gonidia, in an altered condition, are often found in considerable numbers and present many successive changes from the normal green cell to the empty gonidial envelope. In this connection A. A. Elenkin investigated abundant material, and observed that the disorganisation of the gonidia increases in the deeper parts of the thallus, where the zonal character is found to be the result of the distribution of the dead remains of gonidial cells. These gonidial remains are scarcely noticed among the green gonidia and hyphæ, but it is only necessary for a reagent ClZnI to come into contact with the cellular tissue, to bring them distinctly into view in the form of violet-coloured spherical envelopes and shapeless little masses whose connection with the gonidia, without the use of a reagent, would be absolutely impossible to imagine. It is interesting to note that in the staining of the gonidia, different sections of the same thallus appear very dissimilar. In many preparations a whole series of changes in the gonidia could be observed, from deep staining to perfect absence of it. As far as it was possible to judge, the gonidia showing the greatest change from the normal were less deeply stained.

"Pale gonidia" at first sight appear to differ from normal ones only in the absence of colour, but a more careful examination proves beyond doubt that the difference goes considerably further. The contents of the white gonidial cell stains practically the same as that of the hyphæ and are seen as small masses or even scattered about in the form of a number of knots. "Pale gonidia" are also found in which the contents have become separated into tiny spheres united into a single mass. On the addition of ClZnI the "pale gonidia" undergo the same changes as the normal green ones, the envelopes becoming violet and the contents brown from the iodine, though perhaps not to so marked an extent. When a watery solution of methyl green is applied to a fresh section from the plant, the contents of the "pale gonidia," as also those of the hyphal threads, takes a turquoise-green colour, and the pale gonidia then stand out very clearly in contrast with the normal green, their contents becoming sharply outlined. It is interesting to note that pale cells are met with in freely growing *Chlorococcum.* They appear to a very large extent to be invaded by fungoid hyphæ in some specimens. There is every indication that these pale cells of the *Chlorococcum* are identical with the "pale cells" of lichens, but, as far as I know, nothing has been said about them in the literature of the subject. It is evident that when Prof. Elfving examined these "pale gonidia," he inferred that gonidia were formed by the transformation of the extremities of hyphal cells into spherical masses.

Regarding the connection between the hyphæ and the gonidia in the substance of the lichen, the following facts must be noted. Thin microscopical sections make it possible to observe with certainty that all the gonidia have not a close connection with the hyphæ. Some, generally a small number, are either not in contact at all with the hyphæ, as is particularly the case in the more or less strongly developed groups of gonidia; or the contact is so superficial that pressure on thin sections, by means of the cover glass, causes a certain number of the gonidia to become separate from the thallus: so that, even with the most careful observation, it is absolutely impossible to detect any adherent particles of hyphæ or of anything else. Such gonidia, in the great majority of cases, appear to be well-developed spherical cells with a regular cup-shaped chloroplast. The fixed sections of such gonidia, from which chlorophyll has been withdrawn, take a rather deeper tint on staining. But the correct interpretation may be that most gonidia are more or less closely connected with the hyphæ, varying from a simple contact to actual fusion with them.

Most often the gonidia are found in a network of hyphæ, as the figures in every textbook of botany will show. The surrounding hyphæ are stimulated to bud and many fine hyphal threads cover the gonidia all over, and in this way hold the algal cells in a hyphal envelope. This fact, in my opinion, speaks for itself.

The conditions appear to be quite natural; the hyphæ being brought into contact with the gonidia acquire an abnormal generative power which shows itself in an abundant budding and in the formation of short processes, generally filled with protoplasm, spread over the surface of the gonidial cells and extending from one algal cell to all the others in the neighbourhood. In this way whole groups of gonidia are commonly observed which are woven and tied into a single mass by short branches of the hyphæ. These offshoots of the hyphæ, first described circumstantially by Bornet, were named extracellular haustoria by Schwendener.

The above general description of the connection between hyphæ and gonidia must be supplemented by a more detailed examination of one particular example. Elfving made the following observation, which he misinterpreted. From the parts of the hyphæ spread over the gonidial layer, and also from the other hyphal masses, pear-shaped swellings extrude, which adhere so closely to the gonidia that they appear one with them. Such swellings generally leave the hyphal branches as lateral offshoots, but sometimes the hyphæ terminate as club-shaped expansions with gonidia at the end. The club-shaped branches are often met with. They are sometimes in groups, but are always short. If this structure be examined without staining the gonidial cell-walls, one is led to imagine that the swollen part of the hypha has budded off an algal cell. Such an impression is confirmed by the observation that the hyphal swellings just described have a somewhat thin envelope and the protoplasmic contents show a feeble turquoise-green colour to the light. The suggestion that the gonidia are budded off from the hyphæ is increased where a few rounded hyphal swellings are next in order to the end of the club-shaped expansion adhering to the algal cell. In this case a superficial observation may unconsciously put the consecutive swellings not merely into connection with one another, but will include in this consecutive series the gonidium at the end of the chain, the more so, perhaps, because of the close connection with the hyphal branches, for even the most minute examination fails to show the line of union without the aid of reagents. This chain-like appearance can easily be observed both in those gonidia attached to a hypha and to those beaded in a row should they be close to a hypha. In such cases as I observed, the nearest gonidium was the least coloured with chlorophyll and the gonidium at the end of the row the most highly coloured. I shall not go so far as to assert that Elfving came to his conclusions on the basis of the above connection of the hyphæ and gonidia in the lichen thallus, as no drawings accompanied his paper; but in any case the microscopical drawing I have described might well serve to illustrate it.

The misinterpretation respecting the hyphal origin of the algal cells must finally be abandoned if reagents are applied to the specimen, for the staining reaction will be only apparent in the gonidial envelopes, leaving the hyphal cell-walls unchanged. Personally I always prefer ClZnI. On the application of this reagent the gonidial envelope became violet and the limits of the gonidial and hyphal junction were sharply defined.

There can be no doubt that the hyphal club-shaped swellings attach themselves to the envelope of the gonidia. In the first place the attachment takes place, apparently, only on a small part of the gonidial envelope in comparison with the later development. The club-shaped swelling, as it continues to grow, then increases the area of contact, spreading its broad base over the envelope of the gonidium. This may easily remain unnoticed, making it necessary after the use of ClZnI for the gonidia to be viewed in different planes. Besides this, the club-shaped swellings may give rise to buds as full of protoplasm as the swellings themselves. The secondary buds may be obscured by the neighbouring gonidia, thus forming, out of the gonidia and the thick hyphal distention filled with protoplasm, even more shapeless masses than the network of gonidia and short hyphal cells described above.

Compared with the protoplasm of the gonidia, the protoplasm of the hyphal distentions is less easily stained: it takes the stain only after a comparatively lengthy immersion in the staining fluid and loses it more readily when washed. Taking into consideration the definite shape of the distentions above described when compared with the other hyphal threads, and their constant connection with the gonidia, no alternative remains but to consider these distentions definite organs of the plant, playing an important part in the relationship of the fungus to the green algal cell. Both the internal and external appearance of the gonidia to which these hyphal modifications are found to adhere is very varied: though perfectly normal as far as shape and external appearance are concerned, they are more or less changed internally—some are green, some pale, some devoid of protoplasmic contents.

In this connection three forms of external contact between gonidia and hyphæ may be described: (1) The absence of all superficial attachment or contact in the most literal sense—described by Schneider as "simple contact"; (2) Contact in the case of the surrounding of the gonidia with budded hyphal cells, a nearer form of contact, and, lastly; (3) Various stages of attachment, including in their number the union of the club-shaped hyphal distentions when the area of attachment and its strength are particularly significant. In Schneider's terminology, the second and third cases may be described as extracellular haustoria. The attachment of the hyphæ and gonidia is not confined to the external union of the hyphal and gonidial envelopes, the union is considerably closer. As far back as 1893 Hedlund showed, in relation to some drawings of *Lecanora*, *Lecidia*, and *Micarea*, that the hyphæ penetrate the gonidial envelopes in the form of club-shaped distended branches and stimulate the division of the algal cells into two daughter cells. Schneider gave very convincing facts concerning the penetration of the hyphæ into the algal cells, giving the penetrating hyphæ the name of intracellular haustoria. According to his description, this penetration has been observed, so far, in some specimens of *Cladonia*, *Parmelia*, and *Stereocaulon*, and consists in the haustorium piercing the envelope and entering the gonidial cell; but while this is taking place the hyphæ are branching within the cell, between the protoplasmic contents of the cell and the cellulose envelope, but not touching the contents. Peirce in 1899, as the result of his investigations, came to the conclusion that the hyphæ develop haustoria which penetrate the algal cells and absorb the protoplasmic contents of the gonidia, leaving only the empty cell-wall.

These intracellular haustoria were also investigated by Elenkin, and are described in a series of papers devoted to the question of the endosaprophytism of lichens, considering as of secondary importance, it is true, those occurring after the disappearance of the gonidial protoplasm, under the action of some enzeme-like substance acting for this purpose. The numerous microscopical drawings which I have made, to be described later, are, I think, sufficient evidence to show beyond all doubt that the hyphæ do actually penetrate the gonidia and in doing so take root in live algal cells and not only make their way within the cell-wall to the edge of the protoplasm, but actually penetrate the protoplasm itself, piercing it in all directions by slender processes. I believe this to be sufficiently proved both by the drawings of microscopical preparations appended to this paper [in its original issue] and by the microphotographs. The degree to which the hyphal protoplasm absorbs the stain, compared with the gonidial, permits the possibility of differential staining, which results in the hyphal protoplasm standing out distinctly against the darker-coloured ground of gonidial substance.

In the hyphæ which are closely adherent to the gonidial cells, lateral offshoots extend from the area of contact and penetrate the cellulose envelope. The hyphæ having penetrated the algal cells change in appearance, and I believe that they do not fulfil the same functions. It seems to me necessary to distinguish two types of intra-gonidial hyphæ, standing in a close genetic relation to one another. The one to which the term haustorium is especially appropriate, having penetrated the gonidial envelope in the form of thin threads, encloses the protoplasm of the gonidia in a fine network. At first, following the perforation of the cell-wall, the network of tissue extends only over the surface of the protoplasm. During this process, it is sometimes possible to observe the formation of a very complete network of these hyphal filaments between the cell-wall and the protoplasm. In their further development the intragonidial hyphæ extend themselves into the protoplasm itself, piercing it in every direction. This first type of extremely delicate intragonidial hyphæ has the appearance of thin gelatinous branches—to use the accurate expression of Schneider,—which appear to me to be without hyphal envelopes: these thin branches, as may be supposed, are formed only of fungus protoplasm, the cell-wall being either entirely absent or so thin as to be beyond perception. It may be supposed that the hyphæ develop in this type of intracellular haustoria thin threads of protoplasm, or that the hyphal envelopes are destroyed through the activity of the living gonidial cells, so that only the hyphal filaments remain, unaltered in character, but minus the cell-wall.

Before passing on to the second type of intragonidial hyphæ it is necessary to observe another kind of intragonidial formation, for this, as far as can be determined, appears to have no connection with the intracellular haustoria. At first sight this formation resembles drops of oil adhering to the periphery of the gonidial protoplasm in the shape of tiny ridges. The approach of a light shows them to be of a feeble turquoise-green colour, *i. e.* their refraction is the same as that of hyphal protoplasm. As far as is known, the literature of lichenology contains no description of these. At first I took them for drops of oil, but their persistence in the fixed microscopical preparations after the application of several changes of absolute alcohol to the specimen, followed by xylol, suggested the idea of more closely examining these problematical drops. In the first place, I had to assure myself that they were not oil drops. With this object in view, portions of fresh thallus, and also sections cut with a razor, were immersed in absolute alcohol for four days, the spirit being changed daily. Some were then transferred from the alcohol to chloroform, others to ether. The drops suspected of being oil were not dissolved: they did not give an alkaline reaction to alcohol in which they had been kept. A one per cent. solution of osmic acid, in spite of prolonged application, only gave them a brownish tint. This stain brought out something of even greater interest than that which was sought: viz. extremely thin filaments embedded in the protoplasm, and, as it were, attaching to it the beaded prominence already described. These last stain less deeply than gonidial protoplasm, but nevertheless take a deeper colour that the hyphal protoplasm. In preparations kept long in a colouring agent (*e. g.*, during some days in weak solution) the beaded prominences retained their colour, while that of the hyphæ was lost on being washed.

It might naturally be supposed that these beaded prominences were some form of the gonidial protoplasm, but the detailed investigations which were undertaken must convince one that they are foreign organisms. As a rule, they are found, as described above, at the periphery of the protoplasm between the gonidial envelopes and contents, while in some cases they are somewhat separated from the protoplasm. In the latter case it may often be observed that thin filaments extending from them become embedded in the protoplasm, and also that the beaded distention is fixed on a thin stalk. Sometimes these are embedded in the protoplasm itself. A circumstance deserving attention is that, in the pale gonidia described above, the contents consist of a knotted and confused mass which, as I believe, is identical with the beaded distentions on the protoplasm of the green gonidia. On thin microscopical sections showing beaded distentions on their protoplasm the following picture is presented with the utmost distinctness: the gonidial protoplasm is intersected by fine threads forming in places knots of every size and shape; the beaded distentions are, apparently, derived from similar knots of filaments piercing the gonidial protoplasm, but differ in their much larger size. They are distributed especially on the periphery of the protoplasm. Their generally rounded shape becomes irregular, owing to the filaments which attach them to the protoplasm.

The morphology of the beaded distentions described above and their connection with the network of intracellular haustoria, their existence in gonidia, whose contents are obviously wanting, are sufficient in my opinion to prove that these distentions are not a formation of the gonidial cells themselves. The signs indicated, and the similar staining reactions with that of the hyphal protoplasm, must fix them as products of intracellular life. Something in the nature of the beaded distentions appears in the germination of spores in certain genera of lichens having large spores,-such as *Thelotrema*, *Megalospora*, *Ochrolechia*, and *Pertusaria*, although so far it is impossible to draw a complete analogy between the formation I have described and the globular shoots on the germination of spores of the above-mentioned plants, but the analogy demands recognition. According to the investigations of De Bary the spores of the above-named lichens on leaving the endospore develop shoots which take a globular form. These shoots as they further develop burst through the exospore as promycelia, the threads of which, if they do not come in contact with algal cells become part of the substratum. According to the observations of A. Moller, two types of hyphal threads arise from the promycelium which are quite distinct in physiological function. Some typical threads become embedded in the substratum, the others give off branches where they come in contact with algal cells and thus become closely connected with them. If the hyphæ on leaving the promycelium are prevented from fulfilling their function, they die. Generally speaking, the expansion of the hyphal filament into separate spherical distentions does not appear as anything exceptional.

Of especial interest in this connection are the descriptions of Zukal, and then Fünfstück and Bachman's so-called spheroidal cells, most often met with in lichens on a substratum of limestone (calcivores). These were considered first as reservoirs of stored material and secondly as secretions. But if the spheroidal cells appear merely as outgrowths, consisting of substances not required for the fungoid organism, then perhaps the analogy between the distensions of intragonidial hyphæ I have described and the spherical cells is entirely superficial: similarly, the analogy between the spherical shoots of the germinating spores of *Pertusaria communis* etc. and between the same spheroidal cells must also be superficial. This interesting question demands further investigation.

Let us now pass on to the second type of intragonidial hyphæ, which differ from those described above by the obvious presence of a cell-wall. This type of intragonidial hypha is, as a matter of fact, in no way distinguishable from the ordinary hyphal thread. This class of intragonidial hypha was studied by Elenkin in *Lecidea atrobrunnea*. A very large number of gonidia, especially the largest, appeared as if crammed with thick-walled hyphæ containing drops of oil highly refractive in appearance. I have observed this type of intragonidial hypha only in those gonidia which have lost all or nearly all their protoplasm. Instead of the usual contents, in this case the gonidia were filled with hyphæ, which lay as a closely packed mass inside the gonidial envelope.

Having stated the facts observed, let us now endeavour to explain their true significance, and to deduce some conclusions as to the reciprocal relations of the different parts of a lichen, taking care not to lose sight of the fact that the following, like all deductions from observations made, needs experimental proof for its complete justification.

The direct contact of the hyphæ with the cell-walls of living gonidia makes possible an exchange by osmosis or food material between the fungus and the alga. The extended network of the hyphal cells around the gonidia and the enlargement of the surface of contact by means of the formation of a club-shaped hyphal distention, which I have noted, would, without doubt, to a large extent assist such an exchange; but the entire absence in this case of experimental proof of the possibility of osmosis through the hyphal and gonidial envelopes forbids a definite conclusion on this point. It will readily be granted that when two cells of different character come into contact, they may be equally pervious, or one of them may be semipervious, or, again, both may be semipervious in regard to the same substances, or both semipervious, but in regard to different substances, thereby creating a possibility of osmotic filtration of some substances into the fungus and others into the alga. In short, the direction of osmosis in the case under consideration has yet to be confirmed, but the structure of the hyphæ as a network of long capillary tubes may easily allow, by a very similar physical process, a transference of food-substances in the hyphal filaments, on account of the uninterrupted capillary attraction of the hyphæ.

If it is impossible to speak with certainty of the importance or otherwise of the contact of the gonidia and the hyphæ, it is at least certain that the penetration of the gonidial cells at a later stage is attended with obviously fatal consequences to them. Their contents become deformed, contract, and finally the algal cell entirely perishes. As a consequence of this intracellular action, the algal cells sometimes cut off daughter cells, which appear free from haustoria. Perhaps by this method some of the algal cells, which are found in comparatively good condition, having freed themselves from the haustoria, continue their growth; or, possibly, by some other method the same result is attained. In spite of the assertions of Hedlund, Schneider, and Peirce, the algal cells do not always free themselves from the invading haustoria by fission into daughter cells, for the hyphæ, rapidly spreading out inside the mother cells, frequently destroy many of the gonidial daughter cells. The haustoria having penetrated into the gonidial cells appear devoid of cell-wall, perhaps owing to the action of the living protoplasm of the invaded gonidia. The protoplasmic hyphal filaments, feeding on the gonidial protoplasm form a network at its periphery, and gradually forcing their way form local swellings, or beaded distentions which gradually collect together and perhaps mark a definite stage of the development of the fungoid element in its intragonidial life. As the gonidial protoplasm disappears, the hyphal formations continue their development further and further, and when the contents of the gonidia have been entirely absorbed, the plasmatic branches from the hyphæ are extended until they fill the whole gonidial envelope. This phase of the development of intragonidial hyphæ seems to me to correspond with the "pale gonidia" described above. It cannot easily be stated exactly what further happens to these hyphal formations enclosed in the cell-wall of the destroyed gonidia.

I examined these gonidial envelopes, the contents of which consisted of numerous separate and disconnected masses similar to those contained in the interiors of the "pale gonidia." Some of these—generally speaking, those which were not deformed—were found lying in the perforated parts of the gonidial envelope, possibly as the result of pressure from the cover-glass. It is possible that such formations present us with some hitherto unexplained stage of fungoid development, or perhaps they, having no other function to fulfil save that of haustoria, become themselves covered with a thick envelope on reaching the inside of the gonidial cell-wall. Just as, in my opinion, occurs to the haustoria in other cases, when the gonidial protoplasm has been disorganised or destroyed. As the outcome of the above-described stage in the development of the haustoria we are in a position to observe such appearances as that of a gonidial envelope absolutely packed with closely interwoven hyphæ. The superficial fusion of the intragonidial hyphal growths with the external hyphæ observed in the form of superstructure has evidently taken place as the result of the concrescence of the new thick envelopes formed on the unprotected surfaces of the internal haustoria with the old envelopes of the internal hyphæ. Developing further, the intragonidial hyphæ leave the gonidial envelopes and invade the neighbouring gonidia.

The processes explained above lead to a general conclusion which cannot easily be reconciled with the prevailing opinion on the question of the internal relations of the different components of a lichen. The distinct and definite individuality of a lichen as a plant organism, in view of the inexpressibility of the physiological relations between fungus and alga, may readily cause the lichen to be regarded as a plant not substantially different from any other assimilating plant. Wallroth held such a view of lichens, and Minks explained the facts he had observed from the standpoint of the same theory, pushing it to extremes. Elfving belongs to this group, owing to his opinions on the destruction of the gonidia by the club-shaped hyphal distentions. But, since the time of Schwendener the position has not only been made clear, but many times confirmed by experiment, that the lichen is a two-fold organism, consisting of two components, belonging to different classes of plant-systems, and all theories contradicting this basic proposition must be regarded to-day as errors.

Considering the lichen as an organism made up of two constituents, and finding it impossible to reconcile the well-being of the whole with antagonism of the constituent parts, De Bary in 1879 formulated the theory, prevalent to this day, of mutual symbiosis. By this the co-existence of fungus and alga in lichens was explained by their mutual needs and services resulting from their differences in organisation giving rise to joint existence to the mutual benefit of each, and as the final consequences the production of an organism with the power of resistance of a lichen.

The facts described above of the undoubted invasion of the gonidial protoplasm by the haustoria, and the destructive effect produced by the latter are entirely in accord with the theory of the mutual assistance of the fungus and alga. As far back as 1897, Schneider described and classified haustoria by means of which, in his opinion, the fungus in the end absorbs the contents of the gonidial cells. Somewhat later Peirce expressed an even more categorical conviction that the haustoria make use of the gonidial protoplasm, leaving the empty cell-wall. In spite of such views both the above lichenologists hold the mutualistic theory. Peirce acknowledges that he is unable to prove that the alga derives any benefit whatever from its co-existence with the fungus, but holds that the fungus portion of every lichen is absolutely dependent upon the gonidia for all its non-nitrogenous food. It is difficult to understand how the gonidia obtain nitrogen from the fungus, for Peirce himself declares that the hyphæ make use of the entire contents of the gonidial cells, as we have seen from the facts described above.

The numerous investigations of Elenkin also undoubtedly support the fact of the invasion of the gonidia by the fungus hyphæ. If the fungus attacks its partner and feeds on its body, it appears decidedly difficult to speak of mutual service. Even in 1868 Schwendener in his investigations on the colour-changes of the blue-green algæ of lichens came to the conclusion that the fungus was a parasite upon the alga. Bornet also regarded the relationship between the fungus and alga as one of parasitism of the former, owing to the results of his convincing investigations on the destruction of the blue-green algæ by fungus hyphæ. Experiments with prepared cultures did not really give sufficient reason for the assertion of mutualism or antagonism between alga and fungus, but, nevertheless, gave ample evidence of their difference in composition, owing to their actions on independent substances. The experiments of Moller, Bonnier, and Haysen, pupils of Elfving, show that the fungus in the absence of algæ either does not develop at all or develops badly, and that spores do not develop a mycelium in the absence of gonidia. If, however, gonidia are introduced to such cultures, the mycelium begins to develop much better. Is not this direct evidence of the fact that the vitality of the fungus has been reduced to such an extent on account of its parasitic mode of life and that it has lost the power of living independently? Pure gonidial cultures separated from the thallus of the lichen lead to an exactly similar conclusion. In 1867 the experiments of Prof. Faminsen, together with those of Prof. Baranetsky of the University of Kiev, showed that if a lichen is left in water the fungus web becomes rotten, while the alga continues to live, grow, and multiply both by fission and by zoospores. The splendidly arranged experiments of Artari with pure cultures of gonidia from the thallus of *Xanthoria parietina* and *Gasparrinia murorum* show clearly that the gonidia are capable of existing independently, growing on a substratum containing the necessary mineral salts, but not developing so well as on media containing pepton and sugar. In this manner the two components closely united in the symbiosis of a lichen display distinctly varied characters when living independently, and consequently their relations to each other cannot be such as one would expect in a case of simple mutual symbiosis. The persistence of the gonidia is present to such an extent in a lichen thallus that it was sufficient to serve as the foundation of Elenkin's theory of the endosaprophytism of the fungus on the alga, while the facts described in the present work impress one even more strongly with the passive part played by the gonidia and clearly show the parasitism of the fungus. There is this difference between the gonidia and free chlorococci, that the former develop better in nourishing media containing substances with complex molecules (peptones), as is shown by the experiments of Artari. These circumstances can in no way be used as an argument in support of the mutualistic theory. The conditions of life of the gonidia competing with the fungus inside its mycelium might easily react on the algæ in some physiological manner, creating amongst other things that power of absorbing organic food more readily than of assimilating it from inorganic substances. It is possible that in the thallus of the lichen the gonidia make use both of the prepared peptones and of some of the organic material of the fungus, and that these circumstances, relieving the gonidial cells of some of their vital processes, assist them in their struggle against the parasite, but in consequence of the changed conditions of life of the parasite the gonidia cannot in any way be compensated by this service on the part of the fungus. Such a correspondence in the physiological relations of fungus and alga as the reciprocal supply of each other's deficiencies in the numerous necessaries of the vital activities of the component parts, as is implied by the mutualistic theory, cannot be imagined.

In conclusion, we should note that the fact of the more or less certain absence of the cell-wall of the haustoria inside the living gonidia, while the protoplasm of the fungus carries on its physiological function in immediate contact with the gonidial protoplasm, recalls the teaching of the famous mycologist Eriksson. Perhaps the gonidia on becoming separated from the mother cells already carry in their protoplasm some beginning of the fungus, in this way nursing its own parasite. May not Eriksson perhaps be right in his supposition? It is unfortunate that this important theoretical and practical question has yet to be solved, and has not received its fair critical investigation in spite of the fact that its importance makes it deserve the most searching examination.

EAST WILTSHIRE MOSSES AND HEPATICS.

By C. P. Hurst.

Mosses.

The following mosses were gathered in the winter and spring 1917–1918 around Great Bedwyn, which lies about seven miles to the south-east of Marlborough in East Wiltshire, and is near Savernake Forest and not very far from the county boundary between Wiltshire and Berkshire. This border village is situated on the soft white *Marsupites testudinarius* zone of the Upper Chalk near the apex of the London Basin, but the calcareous *facies* of the moss flora is very much masked by the occurrence of Eocene outliers and Pleistocene layers of sand, gravel, and clay in the neighbourhood. The Kennet and Avon Canal passing through Great Bedwyn divides Wiltshire into the two vice-counties North Wilts (v.c. 7) and South Wilts (v.c. 8). All the localities and a number of the mosses are additional to those in my papers "East Wiltshire Mosses" and "County Lists of Mosses" in this Journal for 1916, pp. 17–24, 262–274. The arrangement and nomenclature of the *Census Catalogue of British Mosses* (1907) have been followed, and I am much indebted for kind assistance and notes to Messrs. H. N. Dixon, H. H. Knight, and W. Ingham. The list contains sixteen new vice-comital records for Wiltshire, the greater number of which were made close to Great Bedwyn, and forcibly illustrates the maxim that the more a district is examined the more it produces. 7 = North Wilts; 8 = South Wilts; c.fr. = with fruit; * = new vice-comital record.

Polytrichum nanum Neck. 7*. C.fr., rather plentiful in an old excavation for gravel near London Ride, Savernake Forest; abundant and c.fr. in old excavations for gravel in Savernake Forest just to the south of the London and Bath Road, a little to the west of Puthall Gate. *P. aloides* var. *Dicksoni* Wallm. 7*. C.fr., sparingly in four places in the excavations for gravel near the London and Bath Road above referred to; Mr. W. R. Sherrin tells me he found this uncommon var. in Savernake Forest some years ago, and I think his locality is identical with mine. These excavations near Puthall Gate are a capital locality for *Polytricha*, the following kinds fruiting and flourishing there:—*nanum*, *aloides* and var. *Dicksoni*, *urnigerum*, *piliferum*, and *juniperinum*, and I noticed a tuft of *formosum*, which had probably escaped from an adjoining wood. *P. piliferum* Schreb. 7, 8. C.fr., and very plentifully in the excavation near Puthall Gate above referred to; a very small tuft near Folly Farm; this moss seems rather scarce in this calcareous district. Mr. Knight informs me he generally finds it growing with next species. *P. juniperinum* Willd. 7, 8. Fairly plentiful and fruiting in the excavation near the London and Bath Road above referred to; very sparingly near Folly Farm and at Dod's Down and in Chisbury Wood. This moss is also scarce around Great Bedwyn.

Archidium alternifolium Schp. 7*, 8*. In two localities in small quantity with the hepatic *Scapania curta* (Mart.) Dum., on the ground in walks in Chisbury Wood; very sparingly in a walk in Bedwyn Brails Wood. Sterile in these localities.

Campylopus pyriformis Brid. 8. On tree stumps in a wood near Folly Farm and also on the edge of Wilton Brails Wood.

Fissidens bryoides Hedw. 7, 8. C.fr., on a bank in an old excavation for gravel near Bedwyn Common; in a hedgebank near Newton Shalbourne. *F. crassipes* Wils. 8. On stone in a culvert at Wilton Water, Great Bedwyn (*teste Dixon*).

Pottia bryoides Mitt. 8*. C.fr., sparingly on the ground by the roadside between Folly Farm and Bedwyn Brails Wood (*teste Knight*).

Tortula mutica Lindb. 8. On a sarsen stone near Tidcombe, a village about four and a half miles to the south of Great Bedwyn. *T. lævipila* var. *lævipilæformis* Limpr. 8*. With foliose gemmæ on a tree at Tidcombe, and also fairly plentifully on shrubs and at the foot of trees in a hedgerow near the same village; Mr. Dixon found this var. on elder at Beckhampton in North Wiltshire; it seems not uncommon on trees in the South of England, often by water, and I have found it very plentifully near Burnham-on-Sea in North Somerset (6*), and have also seen it in Berkshire, near Hungerford (22*), and near Ilfracombe in North Devon (4). *T. papillosa* Wils. 7. On stone by a lock on the Kennet and Avon Canal, near Froxfield; Mr. Knight records this generally arboreal species from an old tombstone at Dumbleton, in Gloucestershire, and I have seen it on a tiled roof at Shalbourne, in South Wiltshire.

Barbula lurida Lindb. 7*, 8*. On stone by the locks on the Kennet and Avon Canal, east and west of Great Bedwyn—it occurs on both sides of the canal; also on a sarsen stone at Tidcombe. *B. tophacea* Mitt. 8*. Fruiting freely on the ground at Dod's Down Brickworks—a small form. *B. sinuosa* Braithw. 8. On a tree-root and also on a sarsen stone at Tidcombe.

Weisia viridula Hedw. 7, 8. C.fr., here and there in sandy places, as near Eight Walks in Savernake Forest, near Chisbury, near East Grafton on Upper Greensand, etc.

Orthotrichum anomalum var. *saxatile* Milde. 7, 8. On stone by locks on the Kennet and Avon Canal, near Great Bedwyn; common and fruiting freely. *O. cupulatum* Hoffm. 7, 8*. C.fr., on stone by locks on both sides of the Kennet and Avon Canal east and west of Great Bedwyn. Mr. Knight mentions in the "Mosses of Gloucestershire" that this moss often grows on bridge-walls and canal-locks in that county; Mr. Ingham tells me this species was found in North Wiltshire by the late Dr. Parsons.

Physcomitrum pyriforme Brid. 8. C.fr., on damp ground by the Kennet and Avon Canal near Great Bedwyn.

Funaria fascicularis Schp. 8. C.fr., on fallow ground in two localities near Great Bedwyn.

Philonotis calcarea var. *laxa* Dismier. 7, 8. Both sides of the Kennet and Avon Canal at and near Great Bedwyn extending eastwards as far as Froxfield and westwards to Wootton Rivers, which latter place is six miles from Great Bedwyn; this moss would flourish luxuriantly on the sides of the lock-pounds of the Kennet and Avon Canal, were it not carefully scraped off the brickwork by the lock-keepers, only, however, invariably to reappear.

Webera nutans Hedw. 8. Various patches fruiting freely occur on London Clay at Dod's Down Brickworks. *W. annotina* Schwaeg. 7*, 8. On a gravel walk in the north-east of Savernake Forest, the non-gemmiparous form; the interesting form of this species recorded in my paper "East Wiltshire Mosses" referred to above fruits freely on wet sandy clay by water at Dod's Down, where it is accompanied by *Bryum pallens* Sw., c.fr.; capsules in *Webera annotina* are rare, and Mr. Knight mentions that it is always barren in Gloucestershire. *W. annotina* var. *erecta* Correns. 7*. Plentifully in a valley near the Column, Savernake Forest, growing with *Ceratodon purpureus*. About this var., which the *Census Catalogue* only records for five vice-counties, Mr. Dixon writes:—Your *Webera* is true var. *erecta*, I think. The leaves are wide, plane-margined, and decurrent. It is true the bulbils are rather small; but that would sometimes be the case, and probably also they are not quite fully formed, though they fall off easily." *Bryum atropurpureum* var. *gracilentum* Tayl. 8*. On bare ground near Folly Farm, with copious gemmæ.

Fontinalis antipyretica var. *cymbifolia* Nicholson. 7. In a pool near the Engine House, Crofton, Great Bedwyn; Mr. W. E. Nicholson writes:—"To the best of my recollection your moss agrees well enough with the plant I described as *F. antipyretica* var. *cymbifolia*. The moss I originally described was more robust than your plant, but I have seen others as slender as yours, which I should be inclined to refer to the variety, which seems to be fairly well marked and constant."

"*Neckera pumila* var. *Philippeana* Milde. 8*. On trees in Foxbury Wood, Great Bedwyn.

Thuidium recognitum Lindb. 7, 8. This moss is rather frequent in open grassy places around Great Bedwyn.

Brachythecium cæspitosum Dixon. 8*. Plentiful at the base of four trees at Tidcombe.

Eurhynchium Swartzii Hobk. 7, 8. C.fr., under trees near St. Katharine's Vicarage, Savernake Forest, as well as in the Grand Avenue near the boundary between Tottenham Park and Savernake Forest. I found this moss with capsules in a wet dripping hollow on the coast near Ilfracombe, North Devon, and noticed that in the latter locality the capsules were rather long and arcuate—in fact, resembling those of *E. prælongum*, of which, of course. *E. Swartzii* is a subspecies,—while in the Savernake Forest localities they were much smaller and very short and turgid. Mr. Knight tells me he has noticed the same differences in the capsules in plants sent him from the Pembrokeshire coast and those growing inland near Cheltenham.

Plagiothecium silvaticum B. & S. 7, 8. In woods and rather plentiful at the foot of shrubs in hedgerows near Great Bedwyn, fruiting (*teste Dixon*) sparingly in a wood near Froxfield and also in Savernake Forest.

Hypnum aduncum group *pseudo-fluitans* var. *paternum* forma *gracile* Ren. 8. In masses in a pool near Folly Farm; this moss affects pools on London Clay in this district. *H. fluitans* var. *gracile* Boul. 7*. Very plentifully in and around a small pool on London Clay at about 550 ft. in Chisbury Wood, Great Bedwyn. Mr. J. A. Wheldon writes:—"The moss is apparently a rather abnormal state of var. *gracile* Boul. It is really too young (or badly developed owing to local conditions) to be a good example, and shows a tendency to approach the var. *Jeanbernati* Ren. I think the very slender nerve and alar cells are, however, more characteristic of var. *gracile*, of which it may be looked upon as a depauperate state." *H. fluitans* is an interesting addition to the North Wiltshire moss flora in which calcareous vice-county it cannot be a common plant, for it generally avoids lime, and Mr. Knight gives no record for East Gloucestershire (v.c. 33) and only one (the var. *falcatum*) for West Gloucestershire (v.c. 34). *H. palustre* Huds. 7, 8. This moss fruits freely by the side of the Kennet and Avon Canal near Great Bedwyn.

HEPATICS.

The following hepatics were also gathered around Great Bedwyn in the winter and spring 1917–1918. Out of 281 recorded species the *Census Catalogue of British Hepatics* (1913) mentions only 11 species for North Wiltshire and 18 species for South Wiltshire, the Wiltshire liverworts, like the mosses, having been much neglected. The comparative dryness of the county would probably militate against a long list of these plants being produced. Miss E. Armitage, who is cataloguing the hepatics of the more western county of Hereford, tells me she is doubtful of obtaining so many as one hundred species in her list. The *Census Catalogue* Wiltshire records are due to Messrs. W. R. Sherrin and W. Watson, neither of whom live in the county. Messrs. H. H. Knight and W. Ingham have very kindly helped me with the following short list of twenty-one species (including sixteen new vice-comital records), in compiling which I have followed the nomenclature and arrangement of the *Census Catalogue.*

Lunularia cruciata (L.) Dum. 7*, 8. Both sides of the Kennet and Avon Canal near Great Bedwyn; also in a garden in the village.

Marchantia polymorpha L. 7*, 8*. Both sides of the Kennet and Avon Canal near Great Bedwyn; with ♀ receptacles in a hollow near the Mansion, Tottenham Park.

Aneura pinguis (L.) Dum. 8*. Very wet place near Folly Farm with *Bryum pseudo-triquetrum*, *Hypnum stellatum* var. *protensum*, *H. cuspidatum*, etc.

Pellia epiphylla (L.) Corda. 8. Fruiting very freely on a sandy clay bank in a wood near Folly Farm. Mr. Knight tells me he very rarely sees this calcifugous species near Cheltenham, and that when he finds it near that town it is generally on the sandy clay of the Middle Lias beds. *P. Fabbroniana* Raddi. 7*, 8. Very wet place in Savernake Forest near the Grand Avenue; also by a rivulet in Bedwyn Brails Wood; bog on Burridge Heath; Chisbury Wood.

Blasia pusilla L. 8*. Plentifully on damp London Clay by Water at Dod's Down Brickworks.

Fossombronia sp. 7. On the ground in Chisbury Wood; the spores were absent, so it was impossible to determine the species.

Haplozia crenulata (Sm.) Dum. 7, 8*. On London Clay at Dod's Down Brickworks; also in Savernake Forest on loamy banks.

Lophozia excisa (Dicks.) Dum. 7*. On a gravelly bank in Savernake Forest near the Column.

Plagiochila asplenioides (L.) Dum. 7*, 8. Under trees in woods in both vice-counties.

Lophocolea cuspidata Limpr. 7. At the foot of trees near the Mansion, Tottenham Park. *L. heterophylla* (Schrad.) Dum. 7*. Savernake Forest and Chisbury Wood, a common species. Mr. Knight writes:—"All species of the genus *Lophocolea* have a characteristic [musky] scent by which you can easily recognize the genus."

Chiloscyphus polyanthus (L.) Corda. 8. Very wet place in Bedwyn Brails Wood; by a rivulet in Foxbury Wood; in a bog on Burridge Heath.

Calypogeia fissa (L.) Raddi. 8*. On a sandy clay bank near Folly Farm.

Lepidozia reptans (L.) Dum. 7. Creeping among the stems of *Dicranum scoparium* between the Grand Avenue and the Column, Savernake Forest.

Ptilidium pulcherrimum (Web.) Hampe. 8*. In small quantity on a prostrate but still living stem of *Salix cinerea* in Foxbury Wood, Great Bedwyn, 27 April, 1918. This rare and exceedingly pretty plant is an interesting addition to the Wiltshire hepatic flora. The *Census Catalogue* records it for the following vice-counties:—5 (South Somerset), 57 (Derby), 62 (North-east York), 64 (Mid-west York), 65 (North-west York), 78, 83–85, 88, 92, and 99, the last seven vice-counties being in Scotland; to these records Mr. Ingham tells me to add 54 (North Lincoln). Mr. W. Watson, of Taunton, writes about the South Somerset station:—"*Ptilidium pulcherrimum* was found by me at Selworthy near Porlock, was submitted to Mr. Ingham, and agreed to by him. It was found on 27 July, 1912, on rock with *Frullania tamarisci*. It is interesting to find it occurs in S. Wilts—it was supposed to be a northern and more alpine plant, but this is probably a mistake."

Diplophyllum albicans (L.) Dum. 7, 8*. A small form was abundant on loamy banks in Savernake Forest, near the London and Bath Road, in an old excavation for gravel; rather sparingly on London Clay at Dod's Down Brickworks, the commonest of the hepatics.

Scapania irrigua (Nees.) Dum. 7. Gravelly bank in Savernake Forest near the Column. *S. curta* (Mart.) Dum. 7*. With the previous species on a gravelly bank in Savernake Forest near the Column; also with *Archidium* on walks in Chisbury wood, in two localities.

Radula complanata (L.) Dum. 7*, 8. Rather common on shrubs in hedgerows in both vice-counties, fruiting not uncommonly.

Madotheca platyphylla (L.) Dum. 7*, 8. Trees in Savernake Forest; a common species.

Frullania dilatata (L.) Dum. 7, 8. Common on trees in both vice-counties.

PLANTS OF WEST CORNWALL.

By the Rev. E. S. Marshall, M.A., F.L.S.

Last June I spent a fortnight with my family at Helston; Mr. W. D. Miller joined our party, and Mr. F. J. Hanbury was there for part of the time. A long spell of hot, dry weather had burnt up the coast vegetation, so that the rare Clovers were already withered; during our visit there was a good deal of heavy rain, which interfered with collecting, but we found a few things of some interest.

Viola epipsila Ledebour. Frequent in bogs, upper part of the Cober Valley, *W. D. M.*, sp. Probably not uncommon, as Dr. Vigurs has observed it in many places about Newquay.

Silene maritima With., var. *parvifolia* Druce. I studied this carefully in its original station (Loe Bar), and came to the conclusion that it is an extreme *state*, due to exposure and starvation, rather than a good variety. On the neighbouring cliffs one could find many connecting links between this and the ordinary form; still, it is very pretty, and at once catches the eye as being remarkable.

Genista tinctoria L., var. *humifusa* (Dickson). Locally plentiful between Cadgwith and Poltesco; very handsome and striking, when in full flower.

Valerianella rimosa Bast. (*Auricula* DC.). One of the specimens gathered in a cornfield between Cury and Gunwalloe, where it abounded, has hairy fruit, being analogous to *V. dentata*, var. *mixta*, and *V. olitoria*, var. *lasiocarpa*. This variation does not seem to be mentioned in any books of reference that I have.

Rhinanthus stenophyllus Schur. Sandy, grassy coast, Marazion. In Davey's *Flora* only one locality (Penrose, near Helston) is given for it.

Rumex maximus Schreb. (*R. Hydrolapathum* Huds., var. *latifolius* Trimen). We saw this in Mr. Cunnack's station, Gunwalloe Marsh, growing with *R. Hydrolapathum*, from which it seemed to differ specifically; but of course it was only in bud, on June 25th.

Juncus pygmæus Rich. In small quantity, on drying mud, near Ruan Pool. Rev. R. P. Murray and I found it plentifully on the Lizard Downs, May, 1886.

Carex muricata, Linn. Herb.! (*Pairæi* F. Schultz). Abundant on dry roadside banks, just south of Mullion; recorded by Mr. Druce from between Helston and Porthleven, where I believe that I saw it.

*C. *Leersii* F. Schultz! Grassy ground by Loe Pool, near Penrose Creek. This comes very near to *C. muricata* (*Pairæi*), having its short, triangular ligules and remarkably spreading fruit; though the beak is often a little longer, thus tending towards *C. contigua* Hoppe. It agrees well with the short description of *C. eu-muricata*, var. β, *pseudo-divulsa* Syme, *English Botany*, ed. 3, p. 93, where *C. muricata*, var. *virens* Koch is given as a synonym; but Pfarrer Kükenthal remarked, on one of my sheets, that "*C. virens* Koch est inextricabilis!" New for Cornwall.

C. helodes Link (*lævigata* Sm.). A slender form, with smaller spikelets and fruit than usual—simulating luxuriant inland *C. distans* in habit—grows in a marsh between Gunwalloe and Cury.

Festuca pratensis Huds. Gunwalloe Marsh.

Pilularia globulifera L. Near Ruan Pool; scarce.

ERNEST DAVID MARQUAND.

(1848–1918.)

Ernest David Marquand, who was descended from an old Norman family which settled in the Channel Islands at the close of the twelfth century, was born on February 8th, 1848, at "La Brigade" in the island of Guernsey. His parents, early in the fifties, went to settle in the city of New York, where Ernest was educated at one of the large public schools. On returning to England after his father's death, he received a legal training, and for several years held an appointment as confidential secretary to one of the leading firms of London solicitors.

Always a passionate lover of the country, and a born naturalist, he gave up city life in 1876 and went with his mother to reside at Brockenhurst in the New Forest, where he compiled the list of New Forest Phanerogams which was afterwards embodied in Townsend's *Flora of Hampshire*. In 1879 they moved to Penzance, when for seven years Marquand enjoyed the intimate friendship of John Ralfs and William Curnow. He was Honorary Secretary of the Penzance Natural History Society, to whose Transactions he contributed many papers on local Entomology. In 1888, after his mother's death, Marquand settled in Guernsey, and at once began to investigate the botany of that and the adjacent islands, of which little was then known. He published various papers in the *Transactions of the Guernsey Natural History Society*, of which body he was elected president in 1894; in 1901 appeared his *Flora of Guernsey and the Lesser Channel Islands*, which is noticed in this Journal for 1902 (p. 84).

In 1896 Marquand married and went to live at Richmond, working for some time in the Kew Herbarium. Later, after a residence in Alderney and a sojourn on the Continent, he returned to Guernsey, where he lived for some years. In 1915 he settled at Totnes, and began to prepare a Flora of South Devon: here he died on Feb. 16 of the present year.

Marquand was a member of various Societies; he was elected A.L.S. in 1902, and, in 1906, a corresponding member of the Société des Sciences Naturelles de Cherbourg, in recognition of his essay on Guernsey Norman dialect and patois plant-names. He is commemorated in *Salvia Marquandii*, published by Mr. Druce in this Journal for 1906 (p. 405) and in *Verticillium Marquandi* Massee (1897). His paper headed "Botanical Rambles in Guernsey" (Journ. Bot. 1905, 205) is a witness to his powers of observation and to his possession of an excellent literary style.

To the above notice, for which we are indebted to his son, Mr. C. V. B. Marquand, the following appreciation by Mr. James Groves may suitably be appended:—

"I had the good fortune to know Ernest Marquand particularly well. In the later seventies we had many long days together in the New Forest and in 1880 in Cornwall, and I have kept in touch with him ever since. He was quite the best example of the all-round naturalist I have ever met. He seemed to know all about each living creature, animal or vegetable, even the tiniest, that we came across in our walks. It must not be thought, however, that he was a naturalist only, for I remember our chats during those big days covered a very wide range of subjects, and his keen sense of humour and his dry witty remarks made him a delightful companion. He was thorough and painstaking in all he did, and, not content with knowing plants and animals in the field, he worked assiduously with the microscope at the smaller organisms, of which he was particularly fond. His many papers on the Fauna and Flora of his native island and of the several other districts in which he lived, ranging as they do from man and birds to the unicellular algæ, give some idea of the extent of his 'natural knowledge.' His beautiful slides of diatoms are an evidence of his skill and patience as a manipulator.

"One cannot but regret that his only book, the *Flora of Guernsey*—excellent and admirable though it is,—consists, like other Floras, to a great extent of names and localities, and that his detached papers are for the most part brief, so that much of the immense store of knowledge of plant and animal life which he accumulated cannot be handed on. He possessed just the qualifications for a successful writer on scientific natural history, having the necessary knowledge, the leisure for field work, excellent literary ability, imagination joined to a love of accuracy, a methodical mind, plenty of patience, and a good grasp of detail. He was essentially a countryman in his sympathies and, at any rate when I first knew him, like Ironbeard, 'hated the narrow town and all its fashions'; but his acquaintance with other countries and peoples, combined with natural good sense, counteracted any tendency towards insularity of view. Personally, he was a modest, genial, kindly man, and won the respect and affection of all who knew him."

SHORT NOTES.

PAGE-HEADING OF PERIODICALS. I have read with much interest your recent article on page-headings of periodicals (Journ. Bot. 1917, 288), and am glad to note that the matter is attracting some attention. It sometimes happens that good ideas are put into effect in out-of-the-way parts of the world before they are generally accepted in more advanced communities. The question of topography, arrangement of data, etc., in printed matter has long claimed my attention, and if you will take the trouble to examine the recent volumes of the *Philippine Journal of Science*, you will find that it is at least abreast of the times, if not in advance of most botanical publications in the matters you discuss. We give on alternate pages the title of the publication and title of article with name of the author, supplemented by the volume, number, and year; I should add actual date of issue, but the actual work of printing is subject to so many interruptions on account of the amount of work necessary for other Departments, that it is impracticable to add this to each number, and so the actual dates of issue are indicated on the back of the title-page of each volume. Further, the name of the publication, volume, year, and number is indicated in the upper right-hand corner of each new article, as reprint-covers are frequently removed by their recipients. Since Mr. Burkill has been in Singapore, I note that he has instituted a similar innovation in the *Journal of the Straits Branch, Royal Asiatic Society*.

Your criticism of the indices to the numbers of the *Pflanzenreich* is well taken; but won't somebody write a criticism of the methods of citing this publication? There is absolutely no uniformity in this, and the German authors themselves do not appear to understand what is intended for the volume number; I do not know what is intended myself, but the only thing that is *uniform* for the series is the serial number which is printed only on the covers. The references to the *Pflanzenfamilien* might be interpreted as volume numbers, but this would be a most cumbersome proceeding, and it fails in Warnstorf's treatment of the *Sphagnaceæ*. On the whole, this is one of the most horrible examples from the standpoint of bibliographic citation that I am acquainted with!—E. D. MERRILL, Bureau of Science, Manila.

ALOPECURUS ÆQUALIS Sobolewski, Fl. Petropol. p. 16 (1799). In Bull. Herb. Boiss. 1907, p. 396, Schinz & Thellung propose this name, to displace *A. fulvus* Smith, *English Botany*, t. 1467 (June 1805), current in all floras for over a century; and the name has been actually adopted in the last edition of the London Catalogue, and in the British Museum List. They cite there Ledebour, Fl. Rossica, iv. p. 465 (1853)—not "1833" as given by Schinz & Thellung,—as quoting the name of 1799 among the synonyms of the admitted species, *A. fulvus*. They could not, however, have referred to the Flora in question, where the "description" of *A. æqualis* consists of 3 words—"aristis glumâ æqualibus." This is hardly sufficient in the absence of authentic specimens to oust a well-established British name associated with a full description and an excellent plate, and the single character given is hardly distinctive. The evidence of its identity with *A. fulvus* is quite unsatisfactory, and no wonder that Ledebour ignored the name, while admitting in the synonymy Ruprecht's note. It is hoped that botanists will not adopt it in future citations for the correct scientific name of the grass.—F. N. WILLIAMS.

PLANTAGO CERATOPHYLLA Hoffm. & Link. This is usually named *P. Coronopus* var. *ceratophyllon* Rapin by British botanists; but I believe that its perennial more or less woody root, and other characters, make its claims to specific distinction rather strong. The leaf-cutting varies considerably, even in the same station. I possess specimens from Charmouth, Dorset (*R. P. Murray*); Newquay, W. Cornwall (*Vigurs*); and Blackpool, W. Lancs (*Wheldon*). Mr. Druce also records it from near Dover, E. Kent. I have myself observed it at Parkstone, Dorset; Seaton, S. Devon; Brean Down, N. Somerset (in two forms, one of which has very hairy foliage); Tongue, W. Sutherland; and Greenore Point, Co. Wexford. Decaisne, in DC. *Prodromus*, made this a synonym of *P. macrorrhiza* Poiret (*P. crithmoides* Desf.); but Mr. E. G. Baker points out that it does not agree with the description: and Mr. Lacaita, who knows *P. macrorhiza* well, on the south coast of Sicily, assures me that the identification cannot stand. *P. ceratophylla* seems, at least in Britain, to be purely a coast-plant, as a rule occurring on rocks, though sometimes it grows in sandy soil.—EDWARD S. MARSHALL.

CAREX EVOLUTA Hartm. On May 19 I paid a visit to the Turfmoor near Glastonbury to get a specimen of this hybrid sedge for Mr. Hunnybun to draw, and to examine the plant in an earlier state than in 1915 and 1916. In 1917 the sudden and very serious floods at the end of June, when 9·84 inches of rain fell in 24 hours near Bruton, prevented me on July 2nd from leaving the raised railway which intersects the moor; but this May, Turfmoor is drier than often in summer, and the vegetation advanced. All the sedges generally found on these moors were already in flower, with the exception of *C. Pseudo-Cyperus* which showed no sign of flower-buds, until after two hours' search I came across three immature flowering-spikes. The young leaves of that Carex bear a strong resemblance in colour, width, and texture to those of *C. strigosa*, the drawing of which in Bentham's *Handbook* is misleading as to leaves, which are often very broad. It was satisfactory to find not only a greater quantity of *C. evoluta* growing with *C. lasiocarpa* in the original (1915) station, but some fine plants of it in a different enclosure several hundred yards away. It there grows with very robust *riparia* and a smaller quantity of *lasiocarpa*; whereas in the original station

I still see no true *riparia*. The hybrid bears a general resemblance to small *C. riparia*, but it can sometimes be distinguished at sight by the foliage, which is green and not glaucous, much narrower and more channelled, and far smoother at the margins. It sends up from the creeping rootstock small clumps of leaves of very distinct habit, and apparently without a flowering-spike for a year or two. *C. evoluta* should be searched for in England where *C. lasiocarpa* (*C. filiformis* L.) and *C. riparia* occur in the same district.—H. S. THOMPSON.

VERONICA CRISTA-GALLI (p. 155). This plant was recorded from the Sussex locality mentioned by Mr. W. B. Hemsley in this Journal for 1906, p. 49. This interesting Eastern species seems well able to hold its own amongst our native plants, as the late Mr. Thomas Hilton noted the plant at Henfield in 1888.—C. E. SALMON.

BOOK-NOTES, NEWS, ETC.

MATTHEW B. SLATER, who died at Malton, Yorkshire, in February last, at the age of 88, succeeded his father as a nurseryman and landscape gardener at Malton, but for many years had taken no active part in the business. He was a man of kindly and genial disposition, much liked by his large circle of acquaintance; until within the last few years he was in the habit of paying a yearly visit to London, in summer, and always arranged to spend an afternoon or evening with his old Yorkshire acquaintance, Dr. Braithwaite at Clapham, and J. G. Baker at Kew. Slater communicated a number of localities to Mr. J. F. Robinson for his *Flora of the East Riding*. He was a great friend of Richard Spruce; when the latter came back from South America, he settled at the village of Welburn, near Castle Howard. Spruce was lonely, and more or less of an invalid, and Slater made a point of going over to see and cheer him once a week. He was appointed Spruce's executor, and placed all the papers relating to his South American travels in the hands of Dr. Alfred Russell Wallace, who had gone over a good deal of the same ground. Wallace arranged, and added to them, and in 1908 published them in two volumes as *Notes of a Botanist on the Amazon and Andes* (see Journ. Bot. 1909, 149). Slater edited the mosses for a second edition of J. G. Baker's *North Yorkshire*; the district had been explored by several competent men such as Mr. Ingham of York, Mr. Anderson of Whitby, Mr. Barnes of Harrogate, and by Slater himself: as a result, over a hundred species were added to the list, as well as the Hepatics, which were not contained in the first edition. Slater also took a prominent part in founding the Malton Naturalists' Society in 1880: in 1889 he became a Fellow of the Linnean Society. A portrait with brief biography is given in *The Naturalist* for March.—J. G. B.

AT the meeting of the Linnean Society on 2nd May, 1918, Dr. Marie Stopes gave the substance of her paper, "*Bennettites Scottii*," sp. nov., a European Petrifaction with foliage," as follows:—A new species of *Bennettites* is described, externally very like a

Williamsonia "fruit" both as regards shape and size. It is, however, a young vegetative trunk, probably a "sproutling." The three main points of particular interest about it are:—(1) It is the smallest trunk of *Bennettites* yet known; (2) It is the first European specimen to include well-petrified young foliage; (3) It is well preserved, and elucidates some anatomical details of leaf-structure not completely known from the American specimens. The leaf-anatomy is of the parallel-veined type with well differentiated upper and lower surfaces. To the lower surfaces are attached masses of hairs which almost simulate a tissue. The leaflets lie still folded in the bud.

Mr. J. A. Wheldon sends us a reprint of the very useful and comprehensive paper "On the Collection, Taxonomy, and Ecology of the Sphagna" which was published in the *Lancashire and Cheshire Naturalist* for November, December, and January last.

A paper by Dr. E. J. Salisbury entitled "The Ecology of Scrub in Hertfordshire: A Study in Colonization" appears in the *Transactions of the Hertfordshire Natural History Society*, xvii. pt. i. issued in April.

In the *Naturalist* for April the Rev. W. Johnson announces the discovery on the shore rocks at St. Bees, Cumberland, of *Sarcopyrenia gibba* Nyl., a lichen new to Britain.

The *Annals of Botany* issued in April contains an obituary notice, with bibliography, of the late Ethel Sargant, by Dr. D. H. Scott, and papers on "The Response of Pilobolus to Light," by Rosalie Parr; "The Structure of the Cytoplasm in the Cells of *Alicularia scalaris*," by M. F. Rivett; "A Comparative List of Fern Pinna-traces," by R. C. Davie; "The Lactiferous System of *Hevea brasiliensis* and its Protective Function," by A. Sharples; a systematic study of North American *Convallariaceæ*, by Dr. R. R. Gates; a paper on "Organic Plant Poisons-Phenols," by Winifred Brenchley; "Studies on the Embryo-sac and Fertilization in *Œnothera*," by M. Ishikawa; and some very interesting "Fragments of the Flower Biology of Westralian Plants," by Oswald H. Sargent.

The *Annals of the Royal Botanic Gardens, Peradenyia* (vi. part 4: dated December 1917, but only lately to hand) contains an enumeration, by Mr. T. Petch, of the plants included in two collections of medicinal seeds exported from Ceylon to Holland in 1762 and 1785 respectively: the first contained a hundred packets and was sent to the Chamber of Delft; the second, of a hundred and fifty, went to the Botanic Garden at Leyden. The lists contain the native names and the seeds, followed by those, often identical, in use at the present day, and the scientific name of the plant.

The *Journal of the Linnean Society* (Botany: xliv no. 296) contains the Hooker Lecture, "On the Natural Classification of Plants as exemplified in the Filicales," delivered by Prof. Bower last June; a paper on "Two Critical Plants of the Greek Flora" (*Thymus Sibthorpii* Benth. and *Crepis rutilans*, sp. n.); and "A Systematic Study of the North American *Melanthaceæ* from the Genetic Standpoint," by Dr. R. R. Gates.

NOTES ON ORCHIS MASCULA AND O. MORIO.

By Colonel M. J. Godfery, F.L.S.

On May 9th, 1918, three days after the anniversary of the date on which Hermann Müller first succeeded in witnessing the fertilization of *Orchis mascula* by humble-bees on Stromberg Hill in 1869, and thus confirmed by actual observation the truth of Darwin's theory as to the method of fertilization of this orchis, I made an expedition from Corfe Castle, Dorset, to a certain place where *mascula* and *morio* grow together, mainly in the hope of finding hybrids between these two species. I came to a large field carpeted with thousands of cowslips, and with two great colonies of *mascula*, which the country people there call "Regals," and as they were magnificent in all the glory of full flower, they well deserved the name. *O. morio* was also abundant, but mostly grew in other parts of the field, though a few scattered plants were intermixed with *mascula*.

I sat down to watch in the midst of these pleasant surroundings, hoping that I might see insects visiting the flowers. In this, however, I was for a long time disappointed, but later, when I began to move about and look for hybrids, I saw a large humble-bee, with a conspicuous yellow patch on the thorax (*Apathus vestalis*?), alight on a plant of *O. mascula*, and visit two or three flowers, beginning at the bottom of the spike. At long and uncertain intervals I subsequently saw no less than six humble-bees of two species—one was very large and entirely black, apparently *Bombus harisellus*—visit this orchid, and got close enough in one case to see the insect emerge from the flower with pollinia affixed to its head. As Darwin was unsuccessful in seeing meadow-orchids visited by insects, although he had observed the flowers for not less than twenty years *, I felt that my expedition had not been in vain.

Botanists have long been puzzled by the fact that the spurs of *morio*, *mascula*, and some other orchids are dry, and contain no free honey. Sprengel called the spurs of these orchids false nectaries (scheinsaftblumen), and thought that these plants existed by an organised system of deception. Darwin (*Fertilization of Orchids*, p. 37) did not believe in this, rightly considering that the intelligence of bees was of too high an order to allow of their repeated deception by such an artifice, and certainly when one sees the rapidity and apparent disgust with which bees immediately quit a plant which has nothing to give them, it is hard to believe that any bee would visit more than one flower of such a plant. I saw a humble-bee by inadvertence alight on a spike of *Plantago lanceolata*, and the way in which he spurned it from him made me smile. Further, these orchids grow in spikes, and the spurs are turned inwards amongst the flowers: I do not believe that any bee sees or notices the spurs at all before he alights on the flower.

Darwin discovered that the spur of these orchids consists of two layers, and relates (*op. cit.* 40) that when he cut off the end of the spur of *O. pyramidalis*, a surprising quantity of fluid was emitted on gently squeezing it, although the inside of the spur was quite dry. He therefore concluded that the honey was secreted between the outer and inner layers of the spur, and that the inner delicate membrane was pierced by visiting insects; he elaborated the ingenious theory that the extra time thus taken to suck the nectar was in direct proportion to the time required for the viscid discs to set firm on the insect's head.

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* Müller, Discourse before the Naturhistorischen Verein für Rheinland und Westfalen, 1869.

Delpino, however, whose writings on kindred subjects are of surpassing interest, will have none of this, and maintains that these orchids, with their "enormous development of an illusory spur, *formerly* melliferous, but now dry," have lost their power of secreting honey, that their nectaries are atrophied, that it is a case of organic degeneration, that they are on the high road to extinction. He admits willingly that sometimes liquid is found between the walls of the spur, but says it is only "water of transpiration, or at the most 'linfa,' never honey." Whilst he thinks that this "linfa" might attract a moth like *Acontia luctuosa*, on whose proboscis Darwin recorded 7 pairs of pollinia of *A. pyramidalis*, he considers it totally improbable that it could attract humble-bees. As, however, it is certain that these insects do visit these orchids, he seeks another explanation in the theory, too ingenious to be true, that they go to collect pollen, which they find beautifully assembled in packets and masses ready for convenient transport. His vivid imagination further suggests that when they reach home their comrades disembarrass them of the load by which they are temporarily inconvenienced. It is, however, very improbable that the pollen of orchids, tightly packed and compressed as it is, would be of any use to bees, as it is so very different from the ordinary pollen which they collect from other flowers. Müller, too, saw bees endeavouring to rid themselves of the pollinia, and sometimes succeeding, an act which is quite at variance with intentional collection. As to *mascula* and *morio* tending towards extinction, though local they are abundant. Darwin (*op. cit.* 279) says that of 13 species growing within a mile of his house, *morio* was the only one sufficiently abundant to make a conspicuous figure in the vegetation.

There can be no doubt that both *mascula* and *morio* are effectively fertilized in this country.

On this day I found pollen on the stigma of *mascula* in several cases. I carefully examined four spikes of *mascula* gathered on April 30th, and found that no less than forty-one pollinia had been removed, and four stigmas fertilized. Of specimens of *morio* collected on May 9th, I noted the following results:—

1	spike.	9	flowers open,	4	with both poll. removed and	3	with stigmas fertilized.
1	,,	8	,,	7	,, ,,	7	
1	,,	9	,,	5	,, ,,	3	
1	,,	10	,,	7	,, ,,	3	

It is, however, only fair to state that four other spikes had not been visited at all, but these were younger, and in all probability would have been visited afterwards.

I ascertained by examination with a Coddington lens that the outer wall in *morio* was very thin and coloured, and the inner layer, which appeared to be contiguous with it, consisted, as far as I could see, of a whitish relatively thick layer of apparently spongy cellular tissue; the inner surface of this layer was covered with minute papillæ. When it was gently squeezed a small quantity of clean liquid was exuded at the cut end, which retreated back as soon as the pressure was removed, and was not sticky. It would be interesting if someone accustomed to dissect with the aid of a microscope, and with a knowledge of chemistry, would investigate this fluid and determine whether it is, or is not, honey, and whether the layer of spongy tissue is similar to that which ordinarily secretes honey. Delpino states that there is no trace whatever of the glandular tissue proper to honey-secreting surfaces. He only speaks, however, of Italian specimens, and it seems desirable to ascertain definitely whether this is really the case with the British plant.

I could not find a single hybrid between *mascula* and *morio*. This is hardly to be wondered at; except perhaps, with marsh orchids, hybrids are of very rare occurrence. It is necessary, in order that one should occur, not only that the same insect should pass from the flower, say of *morio*, to that of *mascula* (and bees generally are fairly constant in visiting one species at a time), but also that the flower should not be subsequently visited by an insect bearing pollen from another plant of *mascula*, as, if this took place, the prepotency of the pollen of the plant's own species would entirely nullify the effect of the previous pollinization by the pollen of another species (Darwin, *Cross and Self-fertilization of Plants*, p. 392). I, however, found three beautiful spikes of *mascula* which appeared to be pure white except in the throat of the flower, which is greenish yellow: under the lens, however, very faint-coloured spots were perceptible on the lip.

But my best discovery was a spike of *morio*, each flower of which had three perfect labella, the two upper petals having developed in length, breadth, colour, and markings, into exact duplicates of the true lip, but without a spur. This forms strong evidence against Darwin's theory that the lip is a compound organ, made up of one petal and two petaloid stamens. If this were really the case, all six stamens would have been required to form the three lips in this flower: but the column with its stamen was present and normal. I think we may safely conclude that, since the two petals in this flower had been able to develop into perfect replicas of the lip, that the latter is normally only a more fully-developed petal. In this abnormal plant all three sepals were spreading wide in a vertical plane, and not convergent into a hood, which latter is always a marked characteristic of *morio* both at home and abroad.

This flower was a perfect instance of peloria, as far as the sepals and petals were concerned. The two lip-like petals sprang from the outside of the base of the column, the true lip being joined to the column in the usual way; on each side between the lip and the column there was a conspicuous conical white tooth, evidently rudiments of anthers. The flower had been well visited by insects ; of four flowers open no less than three had masses of pollen on the stigma, one of them having a complete pollinium there. None of the flowers had had their own pollinia removed except one, from which one of the two only had been taken. Possibly this may have been due to some of the insects alighting on one of the lip-like petals, and thus not being in the proper position to remove the pollinia. The column spur and ovary were all normal.

On the 18th May I watched a field full of *O. morio* for some hours in hot sunshine. I caught a specimen of *Apathus rupestris* on *Pedicularis sylvatica* with two pairs of pollinia attached to its head, so that it had evidently deserted *morio* for the latter. I soon after saw another specimen of the same bee visit a spike of *morio*. With this exception I did not see a single insect of any kind visit this orchis. There were not many humble-bees about, but those on the wing evidently much preferred the flowers of *Pedicularis* to those of *morio*. I noticed one fly round a group of about a dozen *morios*, and then pick out a plant of *Pedicularis* growing in the middle of them, which was so inconspicuous that I did not see it until the bee drew my attention to it. But although there was so little doing on this day, I found evidence that *morio* is freely and effectually fertilized. There were as yet very few spikes whose flowering was over, but I gathered seven, from various parts of the field, with the following results :—

	Ovary visibly swelled and evidently fertilized in	Ovary not swelled in	
1...........	8 flowers.	4 flowers.	
2...........	7 ,,	3 ,,	
3...........	11 ,,	1 ,,	(the top one).
4...........	5 ,,	3 ,,	
5...........	5 ,,	2 ,,	
6...........	8 ,,	3 ,,	
7...........	4 ,,	6 ,,	(of these 4 still unfaded).

Therefore, omitting spike no. 7, which is not a fair criterion, for one of the 6 flowers had pollen on the stigma, though the ovary had not yet begun to swell, we find forty-four swollen and developed ovaries against sixteen not swollen. There were not very many *Bombi* about, but those on the wing evidently much preferred the flowers of *Pedicularis* to those of *morio*. There were a few spikes of *morio* of a delicate pink colour scattered singly over the field, much more pleasing in colour than the ordinary purple ones, but of fifteen which I gathered only two had one flower and two had two flowers fertilized, whilst in them all only one flower had both pollinia removed, and one other flower one only. It would thus appear that they are less attractive to *Bombi* than the ordinary purple spikes. In the whole field I saw only one pure white *morio* which had not yet been visited. I noticed at Pisa that pink varieties of the purple

Orchis laxiflora were fairly numerous, but white ones were much rarer. Some of the *morio* had a conspicuous white central area on the lip, but, judging from the number of stigmas fertilized, these seemed to be less attractive than the ordinary form.

A SEVENTEENTH-CENTURY BOTANIST FRIENDSHIP.

By G. S. Boulger, F.L.S.

Messrs. Davis and Orioli, the antiquarian booksellers of Museum Street, last year submitted to me a most interesting copy of Parkinson's *Paradisus* which has now found a suitable home with the other Tradescants in the Bodleian Library. It is a nearly perfect example of the first edition which was published in 1629, when the author (of whom a portrait by C. Switzer appears facing p. 1) was in his 62nd year. A few pages are worn or slightly torn at the margin. The calf binding is old, but apparently not original, and is somewhat misleadingly labelled on the back "Parkinson's Herbal," a title belonging rather to his *Theatrum Botanicum*, which he did not publish until 1640, when he was seventy-two.

The interest of this book, however, consists in the MS. matter which it contains. Whilst there is only a single blank sheet (2 pages) as end-paper at the beginning of the volume, there are thirteen (26 pp.) at the end, besides the remains of one torn out. These seem to be of paper contemporary with the imprint, and bear a small water-mark of a bunch of grapes. The first of these pages, the seventh, and the last seventeen remain blank; but the second, third, fourth, fifth, and half the sixth contain MS. lists of plants headed "Reseved since the Impression of this Booke"; and on the eighth and ninth pages, in another hand, is a MS. list headed "Trees found in Mr. Tradescants Ground when it came into my possession." This latter list is almost certainly in Elias Ashmole's handwriting; and, as he took possession of the Tradescant's garden at South Lambeth on the death of John Tradescant the younger in 1662, it may be interesting to print the list, with the modern equivalents of the names, for comparison with that given by Sir William Watson (Phil. Trans. xlvi. 160) of those remaining in 1749. The thirty trees enumerated are as follows:—

Platinus orientalis verus (*Platanus orientalis* L.).

Platinus occidentalis, aut Virginensis (*Platanus occidentalis* L.).

Arbor siliquosa Virginensis spinosa, Locus nostratibus dicta (*Robinia Pseudacacia* L.).

Cerasus racemosa qubida [quibusdam] Padus Theophrasti dicta (*Prunus Padus* L.).

Periclymenum erectum flore rubro (*Lonicera alpigena* L.).

Nux Vesicaria, Altera Virginensis (*Staphylea trifolia* L.).

Euonymus Theophrasti (*Euonymus europæus* L.).

Lotus Arbor (*Celtis australis* L.).
Sambucus Rosea (*Viburnum Opulus* var. *sterilis*).
Arbor Judæ (*Cercis Siliquastrum* L.).
Cornus Mas (*Cornus Mas* L.).
Cornus Fœmina (*Cornus sanguinea* L.).
Latana, sive Viburnum (*Viburnum Lantana* L.).
Guaicum Patavinum (*Diospyros Lotus* L.).
Syringa alba (*Syringa vulgaris* L. var. *alba*).
Pyracantha (*Pyracantha coccinea* Roemer).
Alaternus (*Rhamnus Alaternus* L.).
Arbutus (*Arbutus Unedo* L.).
Castanea Equina (*Æsculus Hippocastanum* L.).
Pinaster (*Pinus Pinaster* L.).
Laurus Tinus (*Viburnum Tinus* L.).
Laurus Tinus Lusitanicus flore [*sic*] glabro (*Prunus lusitanica* L.).
Tillia (*Tilia vulgaris* Hayne).
Tamariscus (*Tamarix anglica* Webb).
Acar majus latifolium (*Acer Pseudoplatanus* L.).
Rhus Virginiana (*Rhus typhina* L.).
Vitis Virginensis (*Vitis quinquefolia* Lam.).
Apocynum, sive Periploca repens (*Periploca græca* L.?).
Althea arborea flore albo fundo purpureo, Montis Olbiæ (*Hibiscus syriacus* L.).
Seseli Æthiopicum Frutex (*Bupleurum fruticosum* L.).

Ashmole here uses for the most part the names employed by the younger Tradescant in the *Museum Tradescantianum* (1656), which contains a full alphabetical catalogue of the plants in the garden in Latin and English. Thus, on p. 74, we find "Acer Majus Latifolium, sive Pseudo-platanus. The great Maple or Cycamore tree"; on p. 88, "Arbutus sive Virido [evidently a misprint for Unedo], the Strawberry tree"; on p. 119, "Guaiacum Patavinum. Indian Date plum tree"; on p. 120, "Hedera Virginiana, sc. vitis, Virginian Ivy or Vine"; on p. 133, "Laurus tinus Lusitanicus folio glabro, smooth wilde Bay of Portugall"; on p. 135, "Locusta Virginiana arbor, Virginian Locus tree" and "Lotus arbor, Nettle tree."

Sir William Watson (*op. cit.*), after a brief allusion to Tradescant's life and to the Spiderwort, Aster, and Daffodil that bore his name, says: "He first planted here the Cupressus Americanus Acaciæ foliis deciduis . . . now one of the great Ornaments of the Duke of Argyll's Garden at Witton." This is, of course, *Taxodium distichum* Rich. As remaining in the Lambeth Garden he then mentions only:

Borrago latifolia sempervirens C. B. (*Anchusa sempervirens* L.); Polygonatum vulgare latifolium C. B. (*P. multiflorum* All.); Aristolochia clematitis recta C. B. (*A. Clematitis* L.); Dracontium Dod. (*Dracunculus vulgaris* L.); two trees of Arbutus, "the largest I have seen"; and *Rhamnus catharticus*, "about 20 Feet high and near a Foot in diameter."

The lists on the second and four following pages seem all written by one hand, though at different dates and with different pens and ink. As the second heading "Resevecl In the yeare 1630 from forrin partes" occurs near the bottom of the page, presumably the plants enumerated above this were received in 1629, the year in which the book was published. The list begins :—"Inprimis Sittissos Amarantinum," and the spelling of both Latin and English names is remarkable; as, for example, "The Great whyt Renuntcula single, on other sort of Dubble whyt Anemone" etc. Some names have such marginal notes as "from Morine," "from Mr. Robine," "from france Robyne," and "from moonser Robyne."

One entry is significant. It runs as follows :—
"from moonser Robyne on German Rose of mr. parkinson which Is Called Rosa Austriaca flore phenissio." On my first sight of these MS. lists, I thought they might be the work of Parkinson himself in preparation for that second edition of the *Paradisus* which, appearing in 1656, after his death, is stated on the title-page to have been "corrected and enlarged," but does not in fact appear to have been either one or the other. Beginning, as they do, immediately after the first publication of the book, I thought they might well be so; and there are no known manuscripts of Parkinson extant with which comparison of handwriting would have been possible. This entry, however, was decisive, and I was on reading it thrown back upon the conclusion that the lists are the work of Parkinson's friend the elder John Tradescant.

A little further on "Red Honnysottle" is recorded, apparently also from "moonser Robyne"; and then under 1630 "from Constantinoble on Narciss, on Citlamen, 4 Renunttulosæ," two tulips, and "4 sortes of Anemones" . . . . "Resever In the yeare 1631 from Mr. Rene Morine Inprimis Renunttulus Asiatitus flore Duplice luteo . . . . from Bruxsills 6 Hiasinthos." The first list for 1632 occupies more than a page and ends with "from Brussells i 6 Tulipes"; but is followed by another short one for the same year and by the lengthy concluding one, for 1633.

The spelling of these lists is, as will be realized from these specimens, phonetic and illiterate. One peculiarity in it is the uniform spelling of "one" as "on." There is also a remarkable initial I, so adorned with complex flourishes as to lend colour to the notion that the writer may after all have been of Netherlandish origin. On sending notes on these two points to Mr. F. Madan, Bodley's Librarian, together with a tracing of a monogram signature appended to a note in the body of the book in which "Eli-" and "A" seem clearly discernible, I learnt from him that the two first-named peculiarities occur in the MS. narrative of the Russian voyage attributed to Tradescant (see Journ. Bot. 1895, p. 35) and that the signature is almost certainly Ashmole's.

The elder Tradescant died in August 1637. If this interesting volume had retained the original fly-leaves at the beginning, they may have borne evidence of the presentation of this early copy by its author to his friend and contemporary the elder Tradescant, or, of course, it may have been purchased; but as bearing on the friendship of these two men I have brought together all the passages in his *Paradisus* in which Parkinson mentions Tradescant.

"*Pseudonarcissus aureus maximus flore pleno, sive Roseus Tradescanti.* The greatest double yellow bastard Daffodill, or Iohn Tradescant his great Rose Daffodill. This Prince of Daffodils belongeth primarily to Iohn Tradescant, as the first founder thereof. . . . . The first and greatest kinde, we had first from Iohn Tradescant (as I said before) whether raised from seed, or gained from beyond Sea, I know not."

On p. 141, he writes of "Moly Indicum." "It grew also with Iohn Tradescante at Canterbury, who sent me the head of bulbes to see, and afterwards a roote, to plant it in my garden" (pp. 102, 104).

"*Phalangium Ephemerum Virginianum Ioannis Tradescant.* The soon fading Spider-wort of Virginia, or Tradescant his Spider-wort. This Spider-wort is of late knowledge, and for it the Christian world is indebted vnto that painfull industrious searcher, and louer of all natures varieties, Iohn Tradescant (sometimes belonging to the right Honourable Lord Robert Earle of Salisbury, Lord Treasurer of England in his time, and then vnto the right Honourable the Lord Wotton at Canterbury in Kent, and lastly vnto the late Duke of Buckingham) who first receiued it of a friend, that brought it out of Virginia, thinking it to bee the Silke Grasse that groweth there, and hath imparted hereof, as of many other things, both to me and others" (p. 152). This first record of the plant to which Ruppius gave the name of *Tradescantia* in his *Flora Jenensis* (1718) is marked in this copy with a { in ink. Robert Cecil (whose father, Lord Burleigh, by the way, had employed Gerard) was lord of the manor of Shorne near Canterbury. He died in 1612, at which date Lord Edward Wotton owned Boughton Malherbe in the same neighbourhood. The younger Tradescant was born at Meopham in 1608. In 1617 we have a record that Tradescant paid the expense of a passenger to Virginia under "Captain Argall." To 1618 belongs Sir Dudley Digges's voyage to Russia, which Tradescant seems to have accompanied (see Journ. Bot. 1895, 35), and in 1620 he went as a gentleman volunteer under Sir Samuel Argall against the Algerian pirates. Probably the visit to Fermentera mentioned by Pulteney (Biogr. Sketches, i. 176), whence he brought *Trifolium stellatum* L., belonged to this voyage. In 1625 Parkinson entered Buckingham's service: in 1627 he seems to have accompanied him to La Rochelle and Rhé, whence he brought "Leucojum marinum maximum," i. e. *Matthiola sinuata* L. (Parkinson, *Theatrum*, p. 624); and after Buckingham's assassination in 1628—the year before the publication of the *Paradisus*—he entered the service of the Queen Henrietta Maria and established his garden, and presumably his "Ark," at Lambeth.

On p. 190, *à propos* of *Gladiolus*, Parkinson says: "Iohn Tradescante assured mee, that hee saw many acres of ground in Barbary spread over with them."

On p. 346 appears the reference to *Veratrum album*, the "White Ellebor," which gave Hamel the clue to the authorship of the MS. in the Ashmolean collection describing the Russian voyage (Journ. Bot. *l.c.*) :—"In some parts of Russia, in that abondance, by the relation of that worthy, curious, and diligent searcher and preseruer of all natures rarities and varieties, my very good friend, Iohn Tradescante, often heretofore remembred, that, as hee said, a good ship might be loaden with the rootes hereof, which hee saw in an Island there."

On p. 388, of the Mountain Valerian, *Nardus Montana tuberosa*, Parkinson writes:—"The Mountaine Valerian I had of the liberalitie of my louing friend Iohn Tradescante, who in his trauaile, and search of natures varieties, met with it, and imparted thereof vnto me."

On p. 528, after describing the Virginia Strawberry, Parkinson says:—"There is another very like vnto this, that Iohn Tradescante brought with him from Brussels long agoe, and in seuen yeares could neuer see one berry ripe on all sides, but still the better part rotten, although it would euery yeare flower abundantly, and beare very large leaues."

On p. 574 occurs:—"John Tradescantes Cherrie is most usually sold by our Nursery Gardiners, for the Archdukes cherrie, because they haue more plenty thereof, and will better be increased"; and, under Plums, on the next page,

"of all which sorts, the choysest for goodnesse, and rarest for knowledge, are to be had of my very good friend Master John Tradescante, who hath wonderfully laboured to obtaine all the rarest fruits he can heare off in any place in Christendome, Turky, yea or the whole world; as also with Master John Millen, dwelling in Olde streete, who from John Tradescante and all others that haue had good fruit, hath stored himselfe."

On p. 579, speaking of "The Argier Apricocke," Parkinson writes:—"this with many other sorts John Tradescante brought with him returning from the Argier voyage, whither hee went voluntary with the Fleete, that went against the Pyrates in the yeare 1620."

It rather appears as if Parkinson's friendship for the elder Tradescant, beginning before the latter's journey to Russia (1618), when he was still at or near Canterbury, had intensified after his settling at Lambeth and while the writing of the *Paradisus* was in progress.

It seems clear (see Vines and Druce, *Morisonian Herbarium*, pp. xv–xvi) that Lord Danby had arranged that Tradescant was to be the first gardener of the Oxford Garden at "a yearly stipend of 50 li.," in 1637; but the latter seems to have died in August of the year 1637, before entering on those duties, and some three years before the appearance of Parkinson's *Theatrum* (1640).

In this latter work the most noticeable passages referring to Tradescant are on pp. 218, 343, and 624. The first of these, referring to *Veratrum album* L., is practically identical with that already cited from the *Paradisus*. The next, on p. 343, under *Mandragora*, "I saw in my Lord Wootton his Garden at Canterbury, whereof Mr. John Tradescant had then the keeping an other sort," shows that, not only had Tradescant at that period sent roots to Parkinson, but that the latter had also visited him there. To the passage on p. 624 reference has already been made as showing that Tradescant accompanied Buckingham's disastrous expedition to Rhé.

Elsewhere, as on p. 1206, Parkinson is careful to distinguish "Mr. Tradescant the younger" as having brought plants from Virginia and (p. 1465) supplied Parkinson with seed. It is interesting to note that, on p. 1550, the *Robinia*, which Ashmole mentions, is referred to individually. After speaking of it under the name "Pseudacacia Americana Robini," which he expressly states (p. 1552) is his own name, Parkinson adds:—"Arbor siliquosa Virginensis spinosa, Locus nostratibus dicta. The Virginian Locus tree A very like tree hereunto hath beene sent and brought us out of Virginia, growing to be a very great tree and of an exceeding height with Master Tradescant."

It may be added that Loudon (*Arboretum*, pp. 49–50) attributes to the elder Tradescant the introduction of the ten following species:—*Staphylea trifolia*, *Robinia Pseudacacia*, *Syringa persica*, *Pistacia Terebinthus*, *Rhus Cotinus*, *Celtis occidentalis*, *Cistus laxus*, *C. crispus*, *C. populifolius*, and *C. monspeliensis*. His son is credited with the eleven following:—*Platanus occidentalis*, *Taxodium distichum*, *Acer rubrum*, *Vitis vulpina*, *V. Labrusca*, *Caprifolium sempervirens*, *Juglans cinerea*, *Rhododendron hirsutum*, *Jasminum humile*, *Cistus corboriensis*, and *C. hirsutus*.

It may, perhaps, here be noted that in the Ashmole MS., no. 1461, at the Bodleian, traditionally known as "Tradescant's Orchard"—a volume of 64 coloured drawings of fruits—one is named "The Tradescant Cherry" and another is labelled "grown by J. T. at Hatfield."

"JOHN" ROXBURGH.

In the *Biographical Index of British and Irish Botanists* is an entry:

"Roxburgh, John (fl. 1809). Son of William Roxburgh. Resided at Cape four to five years for purpose of collecting. Sent pl. to Lambert. Plants in Brit. Mus. D. Don, Appendix to Lambert's 'Pinus.'"

This information is mainly derived from Don (as cited), whose note in full is:

"Mr. John Roxburgh, who resided at the Cape four or five years for the purpose of collecting plants, sent a very large collection of specimens, well preserved and particularly rich in the genera *Erica*, *Brunia*, *Diosma*, *Phylica*, *Borbonia*, *Hermannia*, *Aspalathus*, *Mahernia*, etc."

In this Journal for 1916 (p. 303), in the course of a paper on John Fleming, I mentioned that *Flemingia prostrata*, published in vol. iii. of Carey's edition of William Roxburgh's *Flora Indica*, was attributed to "Roxb. Jun.": on this I commented—"This seems to indicate that it was added by James Roxburgh, who wrote the preface to the volume, though I was not previously aware that either he or his brother John, who may possibly be intended, had published species."

It was then a question whether James should be included in the new edition of the *Biographical Index*, and it became evident that he, and not John, was the only son of William Roxburgh who had any claims for insertion, for the simple reason that John had no existence! This is made evident by the "family table" of the

Roxburgh family printed by Sir George King in his "Memoir of William Roxburgh" prefixed to vol. v. of the *Annals of the Calcutta Botanic Garden* (1895). In this the issue of William Roxburgh by his three wives is detailed: the seventh child by the second wife is "James, Indian Army, married Miss Carnegie": the name John occurs nowhere in the table.

Sir George gives a detailed history of the *Flora Indica*, from which I extract the following:—"The publication of the Carey and Wallich edition of Roxburgh's *Flora* ended with the second volume. Eight years having elapsed without anything having been done towards the completion of its publication, its author's two sons, Captains Bruce and James Roxburgh, neither of whom was a botanist, determined to print, at their own expense, their father's manuscript exactly as he left it." The only indication that James had any botanical knowledge is the association of his name with the *Flemingia* already mentioned. I had assumed that this had been added by him when he was arranging to print vol. iii. of his father's *Flora*, but this was not the case, as the name "*F. prostrata* Roxb. Junr." stands thus in the manuscript copy of the *Flora Indica* in the Department of Botany, to which reference was made in this Journal for 1902 (p. 420) *, and the attribution was presumably by William Roxburgh himself.

It would seem that the statement in the *Biographical Index* that J. Roxburgh's Cape plants are in the National Herbarium is at best doubtful, if it be not absolutely erroneous. The Roxburghian specimens in the Banksian Herbarium were collected by his father, who "resided a twelvemonth" at the Cape, whence he sent plants and seeds to Lambert (see D. Don, *l. c.*) and also to Banks: the endorsement of one of the Banksian sheets fixes the date as 1799: many of the Ericas described by Salisbury in Trans. Linn. Soc. vi. are based on these specimens and are named in Salisbury's hand. In 1868 R. C. Alexander Prior presented to the Herbarium a large number of sheets from his herbarium containing South African plants, many of which bear printed tickets: "C. B. S. Roxburgh":—these are sometimes accompanied by small tickets in William Roxburgh's hand. A reference to Roxburgh's *Hortus Benghalensis* (1814) shows that plants were introduced from the Cape by "J. R." in 1802 and 1804, which fixes the date of James Roxburgh's stay there: in 1810 and 1811 he introduced plants from Chittagong. It would appear from the Catalogue of Lambert's sale that the South African collections of both Roxburghs were included in lot 264, which was purchased, as the copy of the Catalogue in the Department of Botany shows, by a dealer named Rich for £34. Hence it would seem, as has been already said, that James's only claim to recognition as a botanist is his association with *Flemingia prostrata*, and that "John" had no existence.

James Britten.

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* I may take this opportunity of saying that when suggesting that the 1832 edition of the *Flora Indica* was printed from this copy I was not acquainted with Carey's definite statement prefixed to vol. i. that the work was printed from the MSS. left with him by William Roxburgh.

ALABASTRA DIVERSA.—PART XXIX.*

By SPENCER LE M. MOORE, B.Sc., F.L.S.

1. DE PHOCEA SEEM. NOTULA EMENDANS.

In the *Journal of Botany*, 1870, p. 68, under the name of *Phocea Andersonii*, Seemann describes, as the type of a proposed genus of *Celastraceæ*, a plant in the National Herbarium, collected by W. Anderson in New Caledonia in 1774, which he diagnoses, so far as concerns the flowers, in the following words:—

"*Phocea*, gen. nov. Flores polygami (?). Calyx 5-fidus. Petala .... (v. o ?). Stamina .... Discus nullus. Ovarium sessile, 2-loculare, loculis 1-ovulatis; ovula ab axi adscendentia. Stylus brevissimus, stigmatibus 2 elongatis. Drupa sicca, parva, 2-locularis. Semina erecta exarillata, albumine carnosa; embryone recto."

The description was published too late for inclusion in the first volume of Bentham and Hooker's *Genera Plantarum*, and it appears to have remained for a quarter of a century without notice, until Lösener dealt with the *Celastraceæ* in vol. iii. 5 of Engler's *Pflanzenfamilien*. So many elements of uncertainty attend Seemann's description, that Lösener was led to doubt whether *Phocea* is really referable to *Celastraceæ*, and there was the more reason for this seeing that the absence of a disk and the existence of two long stigmas are features calculated to raise grave suspicion. When it is added that inspection of the type specimen yields no evidence of the surmised polygamy, all the flowers being undoubtedly female, and moreover that the ovule is certainly pendulous from near the top of the cell, the propriety of excluding *Phocea* from the *Celastraceæ* can admit of no questioning.

What, then, is this plant? The given characters would suggest some apetalous genus, and though nothing is said about stipules and since the bilocular ovary excludes it from *Urticaceæ*, *Euphorbiaceæ* would seem to be the Natural Order sought for, the spicate flowers scattered upon a long axis—a character, by the way, Seemann leaves unnoticed—pointing to *Macaranga* or *Mallotus*. Accordingly, search was made in *Macaranga*, and the specimen was found to agree so closely with Vieillard's No. 1160, which is *Macaranga coriacea* Müll. Arg., as to leave no doubt of the two being conspecific, and thus the puzzle is solved.

2. COMPOSITÆ (VERNONIEÆ) AFRICANÆ NOVÆ VEL RARIORES.

Gutenbergia gracilis Muschler MSS. Planta humilis, subspithamea nisi modo semispithamea; *caule* erecto superne ramoso uti rami gracillimo paucifolioso subtiliterque pubescente; *foliis* oppositis paucis summis vero alternis subsessilibus anguste lineari-oblongis obtuse acutis basi angustatis supra scabriusculis subtus laxe albo-tomentosis; *capitulis* pro rata minimis pedunculis propriis elongatis gracillimis fultis corymbum maxime laxum efficientibus circa 8-flosculosis; *involucri* phyllis 2-serialibus lineari-lanceolatis breviter acuminatis pubescentibus; *flosculis* leviter exsertis; *achæniis* parvulis clavatis.

Belgian Congo, Kipanda; *Kassner*, 2693.

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* Types of the species here described are in the National Herbarium.

Folia usque ad 2·5 cm. × 3 mm., etsi sæpissime minora, e.g. ±2 cm. × 2 mm., summa modo 5–10 mm. long., supra saltem in sicco fusca. Inflorescentia tota 5–10 cm. diam. Pedunculi proprii ±2 cm. long., inferne bractea unica minuta sæpe onusti. Capitula pansa 4 mm. diam. Involucri phylla 1·5–2 mm. long. Corollæ purpureæ, usque medium divisæ; tubus infundibularis, extus pubescens; lobi lineari-lanceolati, acuti. Styli rami ex andrœcio eminentes, 1 mm. long. Achænia leviter papillosa, fere 1 mm. long.

A remarkable little species, quite different from its congeners.

This is published as a *nomen nudum* in Ann. Mus. Congo Belg. sér. iv. ii. p. 157: included with it is *Kassner* 2802, which in the British Museum set is *Berkheya gracilis* O. Hoffm.

Gutenbergia Kassneri, sp. nov. Herba spithamea a basi vel fere a basi ramosa; *ramis* satis crebro foliosis ut caulis laxe araneosis; *foliis* inferioribus oppositis superioribus sparsis sessilibus lineari-lanceolatis acutis obtusisve basi leviter rotundatis nonnunquam brevissime amplexicaulibus supra scabridis subtus albo-araneoso-tomentellis; *capitulis* pluribus 5-flosculosis corymbum sublaxum paucibracteatum referentibus pedunculis propriis quam se ipsa brevioribus insidentibus; *involucri* campanulati 4-serialis araneosi phyllis lineari-lanceolatis longe acuminatis intimis equidem acutis; *flosculis* subinclusis; *achæniis* subturbinatis 4-costatis glabris politis.

Belgian Congo, slopes of Mt. Kundelungu; *Kassner*, 2711.

Folia usque ad 5 cm. × 6·5 mm., pleraque ±2·5 cm. × 4 mm., firme membranacea, pag. sup. in sicco dilute olivacea, folia summa gradatim imminuta et in bracteas transeuntia. Pedunculi proprii 1–2 mm. long. Involucri phylla exteriora 4 mm., interiora 4·5 mm. long., nervo perspicuo superne purpurascente percursa. Corollæ extus villosæ; tubus 2·5 mm. long., inferne ·4 mm. superne 1 mm. lat.; lobi longit. 1 mm. paullulum excedentes. Styli rami 1 mm. long. Achænia brunnea, 1·3 mm. long.

Differs from *G. polycephala* O. & H. chiefly in the araneose clothing and the narrower lengthily acuminate involucral leaves.

Var. ANGUSTIFOLIA. Minus araneosa. Folia linearia, summum 4·5 cm. × 3 mm., sed sæpius ± 3 cm. × 2 mm.

Belgian Congo, Lebembe Valley; *Kassner*, 2386.

No. 2711 has been published by De Wildeman and Muschler (Ann. Mus. Congo Belg. sér. iv. ii. p. 164) as *Vernonia Smithiana* Less.

Erlangea (§ BOTHRIOCLINE) **concinna**, sp. nov. *Caule* stricto sursum pauciramoso striato pilis hispidulis induto; *foliis* oppositis (raro subopposítis) superioribus interdum alternis oblongis vel oblongo-linearive-lanceolatis apice obtusis ipso breviter mucronatis basi levissime cordatis inferioribus subsessilibus superioribus leviter amplexicaulibus pag. sup. scabridis pag. inf. albo-tomentosis; *capitulis* pro rata majusculis ∞-flosculosis ramulos solitatim terminantibus pedunculo quam se ipsa longiori insidentibus; *involucri* tubuloso-campanulati laxe araneosi phyllis circa 7-serialibus ovato-lanceolatis (intimis oblongis) breviter acuminatis coriaceis; *flosculis* exsertis; *achæniis* oblongis subtrigonis glabris pallidis; pappi setis perpaucis caducissimis.

Belgian Congo, Kundelungu, under trees; *Kassner*, 2728.

Planta saltem sesquispithamea forsan altior. Folia subtus eleganter reticulata, summum 8·5 × 1·5 cm., exstant vero minora (e.g. 3 × 1·3 cm.) majoribus per paria interposita, exemplarii alterius nobis obvii folia magna pro parte alterna necnon modo 5–8 mm. lat. Pedunculus saltem 2·5 cm. long., nonnunquam revera 8 cm. adæquans. Capitula profecto pansa 2 × 1·5 cm. Involucri phylla interiora apice purpureo-membranacea, extima 6 mm., intermedia 8–9 mm., intima 12 mm. long. Corollæ tubus subcylindricus, 5·5 mm. long.; lobi lineares, tubo circiter æquilongi. Styli rami 3 mm. long. Achænia 3 mm. long., pappi setæ 1·5 mm.

E. monocephala Muschler, founded on a Congo plant (*Kassner*, 2483) unknown to me, must be near to this, but is described as having different leaves and involucres.

Vernonia (§ Lepidella) **praticola**, sp. nov. *Scapo* e rhizomate satis crasso prolixo bispithameo paucibracteato puberulo; *foliis* radicalibus oblanceolato-oblongis obtusis inferne longe petiolatim extenuatis margine undulatis nonnunquam obscure denticulatis membranaceis puberulis additis perpaucis similibus ex scapo prope basin oriundis; *bracteis* sparsis linearibus quam folia multo minoribus; *capitulis* inter minores fere 50-flosculosis in corymbum laxum 4-cephalum pubescentem digestis pedunculis propriis sese sæpissime certe excedentibus fultis; *involucri* campanulati 3-serialis pubescentis phyllis lineari-lanceolatis acutis extimis abbreviatis; *corollis* exsertis; *achæniis* (maturis haud visis) oblongo-turbinatis 5-costatis setosis; *pappi* squamis lanceolatis acutis obtusisve margine ciliolatis setis paucis breviter barbellatis sordide albis nisi dilutissime purpureis.

Angola in meadows on top of the Ferreira do Amarel Mt.; *Gossweiler*, 2877.

Folia 5–8 cm. long., dimidio apicali usque 6–8 mm. lat., inferne modo 1 mm. Scapi bracteæ sæpius circa 10 mm. long. Corymbus 8 × 3 cm. Pedunculi proprii summum 6·5 cm. long., exstant breviores 8–25 mm. long. Capitula pansa 8 × 9 mm. Involucri phylla extima 2–2·5 mm., intermedia 4 mm., intima 5 mm. long., omnia costa sat prominente percursa. Corollæ extus sparsim papillosæ; tubus anguste infundibularis, 4·5 mm. long.; lobi 2 mm. long. Styli rami 2·5 mm. long. Achænia basi haud callosa, 1 mm. long. Pappi squamæ ·75 mm., setæ 2·5–4 mm. long.

Habit much that of *V. præmorsa* Muschler and its allies, but these belong to another section of the genus.

Vernonia (§ Lepidella) **musofensis**, sp. nov. *Caule* stricto circa sesquispithameo superne folioso appresse sericeo-tomentello; *foliis* sessilibus lineari-lanceolatis acutis basi obtusis utrobique appresse pubescentibus; *capitulis* medioeribus ∞-flosculosis in corymbum oligocephalum foliis ultimis plane longiorem sericeo-tomentellum ordinatis; *involucri* late campanulati sericeo-tomentosi phyllis 6-serialibus anguste lineari-lanceolatis acuminatis exterioribus mox recurvis; *corollis* breviter exsertis; *achæniis* cylindrico-turbinatis 5-costatis setosis; pappi squamis angustissime lineari-lanceolatis acuminatis margine minute denticulatis setis pluribus scabridis albis.

Belgian Congo, Musofi river, flanks of hills among trees; *Kassner*, 2683.

Folia pag. inf. glandulis immersis innumeris prædita, summum 7 cm. × 8 mm., juniora vero gradatim imminuta, ultima circa 3 cm. × 5 mm. Corymbus circa 7 × 7 cm.; hujus bracteæ perpaucæ, foliaceæ, circiter 15 mm. long. Capitula pansa 13 × 20 mm. Involucri phylla exteriora 5–7 mm., intermedia 8 mm., intima 10 mm. long. Corollæ anguste infundibulares, extus papillosæ; tubus 6 mm., lobi 2·5 mm. long. Styli rami 3·5 mm. long. Achænia adhuc cruda vix 2 mm. long. Pappi squamæ circa 2 mm., setæ 7·5–8 mm. long.

This is treacherously like and no doubt closely related to *V. fontinalis* S. Moore. The more hairy foliage, the 6-rowed narrower acuminate involucral leaves, the setose achenes (not markedly 5-angled and with papillæ between the angles) and the more numerous setæ to the pappus are the main differences. It is not easy to understand how de Wildeman & Muschler could confuse this with *V. lappoides* O. Hoffm. as they have done (*l. c.* p. 162).

Vernonia (§ Lepidella) **adenocephala**, sp. nov. *Caule* stricto crebro folioso sat valido eleganter striato scabriusculo; *foliis* nonnunquam suboppositis sessilibus ovato-lanceolatis obtusis ima basi cuneatis pergamaceis utrobique scabriusculis et arcte reticulatis necnon pallide nitentibus pag. inf. glandulis paucis magnis immersis conspersis; *capitulis* submediocribus subsessilibus circa 14-flosculosis in glomerulum terminalem polycephalum aggregatis; *involucri* turbinati basi extenuati ∞-serialis glabri phyllis exterioribus parvis lanceolatis intermediis gradatim longioribus lanceolatis interioribus lineari-lanceolatis omnibus acutis rigidis stramineisque intermediis et interioribus glandulis paucis immersis perspicuis præditis; *corollis* inclusis; *achæniis* subcylindricis obscure 5-costatis setosis; *pappi* squamis exiguis linearibus erosulis setis scabriusculis stramineis.

Belgian Congo, Mt. Senga; *Kassner*, 2896.

Folia 6–8 × 2–3 cm., summa pauca minora. Capitulorum glomerulus 3 × 4·5 cm. Capitula 2 cm. long., 7 mm. lat. Involucri phylla exteriora 1·5–2·5 mm.; intermedia 3–5 mm., intima usque 12–14 mm. long. Corollæ tubus inferne cylindricus, juxta limbum expansus, 8 mm. long.; lobi fere 2 mm. long. Styli rami 1·5 mm. long. Achænia nondum matura 1·5 mm., pappi squamæ ægre 1 mm. et setæ 5–7 mm. long.

The massed heads (the foliage is entirely different) give this somewhat the appearance of *Muschleria angolensis* S. Moore, but with this all resemblance ends. A very distinct species.

Vernonia (§ Tephrodes) **sengana**, sp. nov. Planta saltem bispithamea tomento albo-sericeo obtecta; *caule* erecto superne ramoso omnimodo folioso; *foliis* sessilibus oblongo-lanceolatis acutis basi obtusis rotundatisve; *capitulis* submediocribus ∞-flosculosis in corymbum brevem oligocephalum bracteatum digestis bracteis foliis similibus nisi paullo minoribus; *involucri* sericeo-tomentosi 5-serialis phyllis lineari-lanceolatis (interioribus lineari-oblongis) acutis extimis imminutis; *corollis* breviter exsertis; *achæniis* cylindricis basi

callosis 4-costatis appresse sericeis; *pappi* ext. squamis abbreviatis lineari-lanceolatis barbellatis int. setis scabribis albis.

Belgian Congo, Mt. Senga; *Kassner*, 2901.

Folia summum 7·5 × 1·5 cm., pleraque ± 3·5 cm. × 8 mm., summa pauca in bracteas transeuntia circa 2 cm. long. Corymbus circa 6 × 5 cm. Pedunculi proprii validi, plerumque 1·5–3 cm. long.; bracteæ capitulum ipsum attingentes ± 1 cm. long. Capitula circa 12 × 13 mm. Involucri phylla extima 3 mm., intermedia 8 mm., intima 9 mm. long. Corollæ sparsim papillosæ tubus inferne anguste cylindricus superne anguste infundibularis, 5 mm. long.; lobi vix 2 mm. Styli rami 2 mm., achænia 1·25 mm., pappi squamæ 1 mm. et setæ 6 mm. long.

Allied to *V. natalensis* Sch. Bip., which it closely resembles in foliage, but differs from essentially in the capitula.

Vernonia lavandulifolia Muschler in Herb. Berol. This *nomen nudum* de Wildeman (*l. c.* p. 163) gives to *Kassner* No. 2522. This, however, and No. 2742 are conspecific with No. 2777 described by me (Journ. Bot. 1914, p. 334) as *V. oocephala* Bak. var. *angustifolia*. *V. oocephala* is a Tanganyika plant represented further west by this palpable variety.

Another Kassner plant (Ruzizi Valley, No. 3168) is apparently a caulescent form of *V. macrocyanus* O. Hoffm. It is certainly not *V. Grantii* Oliver as Muschler and Wildeman (*l. c.* p. 160) announce.

Vernonia (§ Stengelia) **sciaphila**, sp. nov. *Caule* valido bispithameo simplici inferne nudo superne affatim folioso griseo-tomentoso; *foliis* sessilibus oblanceolatis obtusis nisi mucronulatis leviterve retusis basi obtusis pag. utraque eleganter reticulatis supra cito puberulis scabriusculisque subtus dense pubescentibus; capitulis majusculis ∞-flosculosis corymbum brevem oligocephalum perpaucibracteatum efformantibus; *pedunculis propriis* validis quam capitula longioribus tomentosis; *involucri* companulati 5-serialis pubescentis phyllis extimis lanceolatis rigide ac breviter acuminatis intermediis intimisque appendice brevi acuta obtusave præditis; *corollis* breviter exsertis; *achæniis* linearibus 10-costatis basi sat prominenter callosis glabris; *pappo* biseriali ext. e squamis brevibus anguste linearibus sistente int. e setis scabriusculis stramineis.

Rhodesia, Sangolo stream under trees; *Kassner*, 2106.

Folia summum 10 × 2 cm., sed infima et summa minora, in sicco grisea. Corymbus circa 5 × 5 cm. Pedunculi proprii usque 3 cm. long. Bracteæ capitula appropinquantes, lineares, circa 1 cm. long. Capitula plene pansa 2 × 3 cm. Involucri phylla extima 5–7 mm., intermedia 8–12 mm., intima 15 mm. long. Corollæ sparsissime papillosæ tubus superne leviter dilatatus, 10 cm. long.; lobi tubum semiæquantes. Styli rami 2 mm. long. Achænia 6 mm., pappi squamæ 1·25 mm., setæ pœne 10 mm. long.

Affinity with *V. benguellensis* Hiern, but with several differences in foliage and flowering heads.

Vernonia (§ Stengelia) **agricola**, sp. nov. Scapo e rhizomate valido brunneo-floccoso copiose radicante erecto optime striato puberulo; *foliis* radicalibus sat longe petiolatis oblongo-oblanceolatis obtusis basi extenuatis margine calloso-dentatis pergamaceis utrobique eximie reticulatis pag. sup. nitidis scabriusculisque pag. inf. sparsim pubescentibus; *capitulis* mediocribus circa 25-flosculosis in corymbum laxum paucibracteatum oligocephalum folia longe excedentem puberulum dispositis; *pedunculis propriis* capitulis multo longioribus; *involucri* subhemisphærici 5-serialis puberuli phyllis exterioribus ovatis intermediis ovato-lanceolatis coriaceis ambobus appendice scariosa ovata obtussima verisimiliter purpurea onustis phyllis intimis late oblongis appendice oblonga gaudientibus; *corollis* exsertis; *achæniis* cylindricis 10-costatis breviter setulosis; *pappo* biseriali ser. ext. e squamellis brevibus angustissime lanceolatis sistente setis interioribus scabriusculis dilute fulvo-stramineis.

Rhodesia, Lukanda river, in open fields; *Kassner*, 2136.

Folia (petiolo anguste alato 3 cm. long. incluso) summum 22·5 cm long., 3·5–4 cm. lat., sæpe revera minora, accedit forsan unum minus e scapo oriundum 7–10 cm. long. Scapus sesqui—bispithameus; hujus bracteæ gradatim diminutæ, lineares, vetustiores circa 2–3 cm. long., juniores 5–10 mm. Pedunculi proprii plerique 7–13 cm. long. Capitula pansa 15 × 14 cm. Involucri phylla exteriora 3–5 mm. long., intermedia 7–9 mm., intima 11 mm. long. Corolla sparsissime papillosa; tubus inferne cylindricus superne infundibularis, 8 mm. long.; lobi 3·5 mm. long., styli rami 3·5 mm. long. Achænia 4 mm.; pappi squamæ 1 mm. setæ 6·5–8 mm. long.

Near *V. armerioides* O. Hoffm., which has different foliage, achenes and pappus. A plant at Kew collected by A. Whyte on Mt. Malosa, Nyasaland, may be conspecific but its leaves are smaller and less conspicuously toothed and nerved.

Vernonia (§ STENGELIA) **kuluina**, sp. nov. Planta scaposa, sesquispithamea; *foliis* radicalibus petiolis elongatis gracilibus insidentibus ovato-oblongis vel anguste oblongo-obovatis obtusis basi cuneatis margine undulatis leviterve denticulatis membranaceis supra scabriusculis subtus pubescentibus postea in nervis puberulis; *scapis* cæspitosis ascendentibus pubescentibus bracteis perpaucis linearibus præsertim apicem versus præditis; *capitulis* mediocribus ∞-flosculosis ad apicem scapi solitariis vel 2–4-nis pedunculis propriis dense pubescentibus quam sese brevioribus incidentibus; *involucri* campanulati 4-serialis phyllis oblongo-lanceolatis appendice brevi acuta fusca vel purpurea onustis exterioribus dorso griseo-pubescentibus intimis glabris vel fere glabris; *corollis* exsertis; *achæniis* basi prominenter callosis cylindrico-turbinatis 5-costatis appresse setulosis; *pappo* ext. squamoso squamis brevibus lineari-lanceolatis acutis pappo int. setoso setis scabriusculis sordide stramineis.

Angola, open woods at the Kului river near Forte Dom Affonso; *Gossweiler*, 2904.

Folia in sicco griseo-viridia, pleraque (absque petiolo) 4–5 × 1·5-fere 2·5 cm., etsi minora exstant; petioli usque 5 cm. long, sæpius ± 3 cm. Scapi 22-fere 30 cm. alt.; horum bracteæ plerumque 7–16 mm., raro 30 mm. attingentes. Capitula pansa 12 × 15 mm. Involucri phylla extima 4–5 mm., intermedia 6–7 mm., intima 7–8 mm.

long. Corollæ tubus superne leviter gradatim ampliatis, 7 mm. long.; lobi 2 mm. long. Styli rami 2 mm. long. Achænia 2 mm., pappi squamæ 1 mm., setæ 7 mm. long.

V. præmorsa Muschler and *V. castellana* S. Moore are close to and at first sight greatly resemble this, which is a larger-headed plant than either with relatively longer and narrower involucral leaves and different achenes and pappus.

Vernonia (§ STENGELIA) **incompta**, sp. nov. *Caule* bispithameo vel ultra ascendente verisimiliter simplici inferne nudo superne foliato dilute fulvo-tomentoso deinde pubescente; *foliis* sessilibus lineari-oblanceolatis apice mucronatis basi obtusis margine distanter calloso-denticulatis pergamaceis supra scabridis subtus arcte tomentellis; *capitulis* inter minores ∞-flosculosis corymbum oligocephalum bracteatum quam folia longiorem referentibus; *involucri* subhemisphærici tomentelli phyllis 6-serialibus extimis oblongis ceteris late oblongis vel subquadratis et appendice ovata rotundata onustis; achæniis hucusque valde immaturis oblongis glabris; *pappi* setis superne compressiusculis scabriusculis dilute stramineis.

Northern Rhodesia, Sangolo stream; *Kassner*, 2261.

Folia usque ad 8 × 1 cm.; sæpius vero ± 6 cm. × 6 mm., supra in sicco fusca, subtus eleganter reticulato-nervosa. Corymbus circiter 10 × 5 cm.; pedunculi proprii 5–10 mm. long. Bracteæ lineares, ± 5 mm. long. Capitula vix matura 8 × 9 mm. Involucri phylla extima 4–5 mm., cetera 6–7 mm. long., hæc 2·5–3 mm. lat.; appendix sola usque ad 3 × 3·5 mm. etsi sæpe minor. Corollæ nondum pansæ lobi dense papillosi. Achænia ·4 mm. long, pappus 3 mm.

To be inserted close to *V. Britteniana* Hiern and *V. cardiolepis* O. Hoffm.; the chief difference resides in the involucres.

VERNONIA CAMPICOLA S. Moore in Journ. Bot. 1914, p. 97.

Belgian Congo, Kapaila; *Kassner*, 2546, 2548. Lubembe-Luapula junction; *Id.* 2426.

Muschler and de Wildeman refer No. 2546 quite wrongly to *V. calvoana* Hook. fil. (*l. c.* p. 159). All three numbers are attached to specimens perfectly conspecific with the type, *Kassner*, 2845 *a*.

Vernonia (§ STROBOCALYX) **inanis**, sp. nov. *Caule* erecto valido ramos complures erectos gignente uti rami longitrorsum striato necnon glanduloso-scabriusculo-puberulo; *foliis* sparsis sessilibus linearibus obtusis scabridis; *capitulis* parvis paucifloscculosis in paniculam elongatam angustam scabriusculo-puberulam dispositis; *involucri* anguste ovoideo-oblongi pubescentis phyllis oblongo-lanceolatis acutis vel obtusiusculis intimis quam cetera plane longioribus; *corollis* (nondum pansis) verisimiliter inclusis; *achæniis* adhuc crudis oblongo-turbinatis basi perspicue callosis setosis; *pappo* ext. e setis maxime abbreviatis constituto int. e setis elongatis his breviter barbellatis omnibus dilute stramineis.

Angola, Munonque; *Gossweiler*, 3343.

Planta ultra bispithamea. Folia saltem in sicco arcte revoluta, plerumque 1–3 cm. long.; costa media pag. inf. optime eminens. Paniculæ bracteæ foliis similes, ± 1 cm. long. Pedunculi proprii circa 5 mm. long. Involucra 7 × 4 mm.; phylla extima 1–2 mm., intermedia ± 4 mm., intima 6 mm. long., omnia sordide straminea. Corollæ albæ, immaturæ solum visæ 4 mm. long. Achænia 1 mm. long.; pappus ext. ·4 mm., int. 4 mm. long.

V. glaberrima Welw., to which this is nearly allied, has foliage and heads diverging in several respects.

Vernonia (§ Strobocalyx) **assimilis**, sp. nov. *Caule* ascendente folioso molliter tomentello deinde glabrescente; *foliis* petiolatis ovatis vel ovato-oblongis apice mucronatis basi rotundatis margine subdistanter denticulatis denticulis induratis membranaceis supra scabridis subtus dilute fulvo-tomentosis; *capitulis* circa 11-flosculosis corymbum polycephalum satis compactum foliis subæquilongum tomentellum efficientibus; *involucri* tubuloso-campanulati 5–6-serialis phyllis exterioribus abbreviatis ovatis acutis interioribus gradatim longioribus ovato-lanceolatis vel lanceolato-oblongis acutis vel obtuse acutis his dilute fulvo-tomentosis illis pubescentibus; *corollis* exsertis; *achæniis* cylindrico-turbinatis 10-costatis appresse setosis; *pappi* setis subbiseriatis scabriusculis stramineis.

Belgian Congo, Lafubsu river, mountain slope; *Kassner*, 2875.

Folia pleraque 7–8 × 3·5–4 cm., pag. sup. in sicco fusca; petioli tomentelli, 8-10 mm. long. Corymbus circa 8 × 9 cm. Capitula pansa circiter 8 × 6 mm. Involucri phylla exteriora 1·5–2 mm., intermedia 2·5–3 mm., intima usque 5 mm. long. Corollæ verisimiliter albæ; tubus infundibularis, papillosus, 5 mm. long.; lobi lineares, 2 mm. long. Styli rami 2 mm. long. Achænia hucusque cruda 2 mm. long., basi leviter callosa; pappus 5 mm. long.

Affinity with *V. podocoma* Sch. Bip., but with marked divergences in foliage and flowering heads.

Vernonia (§ Lampropappa) **arenicola**, sp. nov. *Caule* ascendente lignoso sursum ramoso sparsim folioso arcte subtiliterque tomentoso deinde glabrescente; *foliis* subsessilibus ovatis obtusis nisi obtusissimis basi obtusis pergamaceis puberulis utrobique eximie reticulato-nervosis glandulis perpaucis lucentibus immersis inspersis; *capitulis* 10-flosculosis in corymbos breves pluricephalos tomentosos bracteis foliis similibus sed multo minoribus onustos dispositis; *involucri* tubuloso-campanulati tomentosi 4-serialis phyllis oblongo-ovatis obtusis vel acutis; *corollis* exsertis; *achæniis* cylindrico-turbinatis 5-costatis dense setosis; *pappi* setis circa 4-serialibus aliquanto compressiusculis breviter barbellatis niveis.— *V. eremanthifolia* O. Hoffm. in Baum Kun.-Zamb. Exped. 402 nec *ejusdem* in Bull. Soc. Brot. xiii. 15.

South West Africa, on the Longa above Minnesera; *Baum*, 711.

Folia exempl. unici nobis obvii summum 7·5 × 4·5 cm., alia 5–6 × 2·5–fere 3·5 cm., juniora in bracteas transeuntia 3–3·5 cm. long. Rami patentes, ± 10 cm. long. Bracteæ vetustiores 1–2 cm. long., ultimæ modo 3 mm. Capitula pansa 10 × 12 mm. Involucri phylla exteriora 2–3 mm., intermedia 4–5·5 mm., intima 6·25 mm. long. Corolla infundibularis; tubus 6·5 mm. long.; lobi 3 mm. long. Styli rami 2 mm. Achænia basi callosa, 3 mm. long., 1·5 mm. lat. Pappi setæ inter se inæquilongæ, longit. 9 mm. attingentes.

Very like *V. eremanthifolia* O. Hoffm. in foliage, though the leaves are somewhat broader. But the narrower heads have fewer florets and narrower involucral leaves, while the achenes are differently shaped and rather prominently ribbed and the pappus is longer. The corollas of *V. eremanthifolia* are unknown.

3. JATROPHÆ SPECIES NOVA BRASILIENSIS.

Jatropha (§ POLYMORPHÆ) **Robertii**, sp. nov. Verisimiliter herbacea; *ramis* compressis foliosis glabris; *foliis* longipetiolatis 3–5-palmatim lobatis basi cordatis lateve truncatis membranaceis utrinque glabris lobis ovatis acutis vel breviter acuminatis margine undulatis basalibus dum adsint imminutis; *stipulis* verisimiliter cito dehiscentibus; *floribus* in paniculam laxam cymosam plurifloram longipedunculatam dispositis; *bracteis* exiguis subulatis; *pedicellis* masculis calyce longioribus; *calycis* masc. usque medium divisi glabri lobis triangularibus acutis; *petalis* inter se liberis oblongo-obovatis obtusissimis conspicuis; *staminibus* 8 filamentis in columnam satis longam connatis; *disco* 5-glanduloso; *petalis* fll. fem. axin terminantium breviter pedunculatorum absentibus; *ovario* subgloboso 3-loculari; *stylo* abbreviato basi incrassato ramis 3 integris coronato.

Matto Grosso, Corumbá; *Robert.*

Foliorum limbus usque ad 10 cm. long., circiter totidem lat., in sicco læte virens subtus paullo pallidior; pars indivisa 1·5–2 cm. long.; lobus centralis 8·5–9 × 4·5–5 cm.; lobi intermedii plerumque 6–7 × 3·5–4 cm., basales 1–3 cm. long.; petioli crassiusculi 5·5–6 cm. long., 2 mm. lat. Pedunculus 10 cm. long., vel paullulum ultra bracteæ 1–2 mm. long.; pedicelli masc. ± 4 mm. long.; fem. validi, 3 mm. long. Calyx masc. in toto 4 mm. long.; lobi 2 mm. Petala punicea, breviter unguiculata, 12 mm. long. Columna staminea 4 mm. long., filamenta libera 2–3 mm. Calyx fem. quam masc. paullo major. Ovarium 2 mm. long., mox usque ad 9 × 9 mm. auctum. Stylus ·7 mm., rami ·5 mm. long.

Foliage except for the lobing much like that of *J. Curcas* L. which belongs to another part of the genus. The chief points are the long peduncles and the conspicuous pink petals of the octandrous flowers.

(To be continued.)

BIBLIOGRAPHICAL NOTES.

LXXII. MORANDI'S 'HISTORICA BOTANICA PRACTICA.'

AMONG the MSS. in the Department of Botany is a volume which is thus described in the Catalogue of the Library of the Natural History Museum:—"MORANDI (G.) [A volume of autograph MSS. formerly in the library of Count Donato Silva, including portions of a projected 'Erudimenta Botanica' in Latin and Italian, with 122 sheets of original pen-and-ink drawings of Plants, that formed the basis for those in his 'Historia,' and 11 sheets of similar drawings of Medicinal Plants, arranged in alphabetical order according to their names]."

A careful examination of the volume has led to its rearrangement and has brought to light various details which seem of sufficient interest to place on record.

I. THE AUTHOR.

Apart from his published work, which will be considered later, little is known of Morandi beyond the brief account given by Saccardo (*La Botanica in Italia*, i. 113):—

"MORANDI (Gio. Battista), cavaliere milanese sulla metà del sec. xviii: pittore e botanico, delineò le tavole di alcuni fra i primi volumi della 'Iconographia taurinensis,' che si conserva presso l'orto botanico di Torino e ben 13 vol. di tavole di una 'Collectio plantarum quæ in diversis Europæ Africæ Asiæ et Americæ locis nascuntur,' che si custodisce nella biblioteca del collegio Ghislieri di Pavia." To this is added a reference to his *Historia Botanica Practica* and (ii. 75) a mention of a portrait—"Acquar. nell' ist. bot. di Bologna. Riprod. fot."

It is not clear whether Prof. Saccardo has himself seen these unpublished works, of which Morandi, in the address to the reader prefixed to his *Historia*, gives the following fuller account:

"I. Exterarum & Rariorum Plantarum, quae in Horto Regio Taurinensis excoluntur. Imagines ad vivum expressæ a Joanne Baptista Morandi Mediolanensis, in tribus Voluminibus in f., atque in Biblioteca Regiae Universitatis ad commune commodum locatæ.

"II. Collectio Plantarum, quae in diversis Europae, Africae, Asiae, & Americae locis nascuntur, graphicè delineatarum, expressarumque a Joanne Baptista Morandi Mediolanensi unà cum variis illarum nominibus justà Celeberrimos Rei Herbariae Scriptores: Volumina XIII in f., quae in insigni Ghisleriorum Collegio Papiensi asservantur."

Prior to the publication of the *Historia*, Morandi issued a pamphlet which is entered in Pritzel as:—"Osservazioni intorno al sinonimo alfabetico dell' erbe più usuali, che si legge nell' antidotario Milanese. Milano, 1743. 4°. 8 p. 1 tab." This was attacked by Cesare Carini in a pamphlet published in the same year, to which Monardi replied in a "Riposta" of 24 pages defending his work. According to Haller (Bibl. Bot. ii. 337, where the name is printed "Canni") Carini pursued his attack in a pamphlet "In confirmazione per dimostrare gli errori del Monardi nella riposta." I do not find Carini's name in Saccardo nor in any book I have been able to consult.

II. THE 'HISTORICA BOTANICA PRACTICA.'

Of this the following description is given by Haller (Bibl. Bot. ii. 337):—

"*J. Baptistæ* MORANDI *Historia medico-practica plantarum, quæ ad medicinam pertinent*, Mediolan. anno 1744 fol. recuso anno 1761, fol. nihil mutata *Comm. Lips.* Icones omnium plantarum in medicina receptarum, neque optimæ, neque malæ tamen; descriptio, locus natalis, tum virium medicarum indicatio. Tabulæ 68, plantæ circa 800."

The first edition was printed and published at Milan by Peter

Francis Malatesta, at the price, according to Pritzel, of 25 lire, which even for those days seems astonishingly small. The volume has an elaborate decorative frontispiece, at the foot of which is an open book having on one page the figure of a *Euphorbia* and on the other "Eques Joães Bãpta Morandi Inventor, Delineator, et Sculptor," accompanied by implements of painting and engraving. The device on the title-page is in the same style; it embraces besides the implements mentioned those of agriculture and horticulture, and books, one of which is opened at two figures of Euphorbias; the others, closed, bear the names of Bauhinus, Tournefort, Boerhaave, and Morison: the work is described as "Opus Equitis Joannis Baptistæ Morandi Mediolanensis Botanici-Galenici-Pictoris." There is a long dedication to Cardinal Puteobonelli, Archbishop of Milan, followed by an address to the reader. Having mentioned the two unpublished works whose titles have been given above, he explains the plan of the present work: the paragraph relating to the figures may be quoted, as it describes their scope, and calls attention to certain features of special value or interest:

"Integrum Opus triginta quinque in Classes fuit distributum: sua quodlibet continentur Classe germen, sua singulari notatur Stirpe; Genera, Specieque distinguitur: Figura nedum plantae, verum etiam Scapi foliorum, Florum, Fructuum, Seminum, Radicum exhibentur. Quae omnia multis in Voluminibus peculiari colore pinguntur. Certitudo, quae hoc in negotio maximi profectò facienda est, non desideratur. Quippe manibus meis Plantas Herbasque obtulit sedula diligentia, qua veluti suscepto a natura exemplo, eas pro intelligibili mensura, & magnitudine delineavi; postmodum fideliter sculpsi. Moneo insuper hoc in loco de Capillaribus herbis &c., me ita ipsarum flores, fructus, atque exigua semina propofuisse, ut planè dignosci microscopio possint."

The figures, although by no means equal in execution to the originals, to which reference will be made later, are I think better than Haller's description would imply; the details are carefully executed, and the plants were evidently, as the author states, drawn from actual specimens. It will be noted that in some copies they were coloured; Pritzel saw one of these, but those I have seen have been plain.

The address to the reader is followed by the *imprimatur* and a restriction of copyright to the author: then comes an index of the classes, and a list, occupying two pages, of authors quoted; this shows, as does the text of the work, a wide range of reading. The text is divided into two parts, separately paged: the first (32 pp.), headed "Explicatio Plantarum," contains a summary of the "distributiones" or classes: the second a detailed description of each species, with an account of the "temperamentum et vires": the synonymy is very full. The classification presents interesting features, and the book from this point of view seems to merit more attention than it has received: I do not find it mentioned in any of the lists in Linnæus's *Philosophia Botanica* nor in his *Bibliotheca Botanica* (1751).

The religious tone which pervades the dedication may perhaps be considered as a concession to the dignitary to whom it is inscribed; there are, however, other evidences of the author's piety which read somewhat strangely at the present day: it must indeed be long since a work of this character concluded with an ascription such as the following, which has a certain charm:

"Tibi, rerum omnium Conditori, qui verbo tuo de terra medicinam oriri fecisti, mihique servorum tuorum minimo mirabilia tua ad totius humani generis commodum, sanctissimique tui nominis gloriam, in publicum proferre dedisti, tibi honorum omnium datori laudem persolvant omnia opera manuum tuarum in aeternum, et ultra. Amen."

The second edition, printed by Joseph Galeati at Milan in 1761, although described by Haller as "nihil mutata," differs in a few unimportant particulars. It was reset throughout and occasionally the distribution of the text was changed—*e. g.* the last sentence on p. 19 of the first edition is in the second run over to p. 20, causing a rearrangement of 20 lines: the "privilegium" by which in the first edition all rights of sale etc. are secured to Morandi and his heirs for ten years naturally disappears from the edition of seventeen years later. The text, however, remains unaltered.

III. The MSS.

An examination of the volume of MSS. which forms the true subject of this paper shows that the account quoted at the outset from the Library Catalogue, though in the main accurate, conveys an inadequate notion of its contents. It consists of several portions, the most interesting of which is the series of 122 folios of exquisitely executed drawings in Indian ink; these formed the basis of the published volume, the engravings in which give an insufficient notion of the delicacy of Morandi's originals. The published volume, however, contains a much larger number of figures, and some of those in the MS., *e. g.* the monstrosities of *Plantago* (f. 155), are not reproduced. Besides these there are in Morandi's beautiful hand four MSS., two of which, written in double columns (Latin and Italian) are of considerable extent.

The first—"Explicatio Plantarum" (47 pp.)—begins with a draft of pp. 31–32 of the "Explicatio" in the published volume: the headings of each division are identical with the latter, but only a list of the names of the genera with references to authors is given under each, and the names do not always correspond with those published, although the plants themselves do so.

It is evident from this MS. that the plan of the work was more extensive than its execution. The last division in the published volume, headed "Flores polypetalo, personato, innato apici ovarii, semine pulverulento" is in the MS. followed on the same page by "Plantæ Monocotyledones foliis terminalibus carentes Apetalæ" and other sections which include *Cyperaceæ*, *Juncaceæ*, and *Gramineæ*; these are followed by six pages headed "Arbores et Frutices quæ in pregressiá stirpium serie non apparent": of all these there is no trace, either in the published volume or in the drawings. The concluding sentence runs:—

"Plantarum demum quamplurimæ in superius recensitis classibus distributæ, ad amussim conspiciuntur æniis Tabulis delineatæ, una cum eârum nomenclaturà, descriptiones viribus, in nostrà Historiâ Botanico-Practicà, seu Historia Plantarum quæ ad usum Medicinæ pertinent."

The other long MS. (p. 61, also in Latin and Italian) is headed "Dilucidatio vocum, quibus Rei Herbariæ Scriptores uti solent, suis Iconibus accurate expressa, et declarata." This is a very elaborate and interesting glossary, in which the definitions of various authors are cited, and numerous examples are given for illustrations of which references are made throughout to the then unpublished work; they run: "vide nostr. Histor. Botan. Pract. Tab. Icon." One definition may be quoted: "*Herbarium* sive Hortum Siccum appellant collectionem Plantarum exsiccatarum, quæ in codicibus vel capsis asservantur, ut quavis anni parte in spici possint."

Besides these two MSS. there are two smaller ones—one, a sheet of three pages containing definitions in Latin and Italian of "Botanica" and "Plantæ," the latter containing a method of classification: the other, of two pages, is a preface which, like the above definitions, seems to belong to the "Dilucidatio," although it is on paper of smaller size—perhaps a draft?—this is only in Italian. The concluding paragraph is rather graceful: "Gradisci benignamente questa mia picciola fatica, come Caparra, che ti do' ch' operare à maggior' gloria di Dio et utile della Repubblica, e dà tal simolo piacendo all' Altissimo sortiranno alla Luce altre cose circa quest' Arte, quali anch' elleno saranno con le' altre compatite. *Hec ergo* (Lettori amatissimi per servirmi delle parole del Crisostomo) *Hec ergo jaciamus tamquam fundamenta et deinde omnia expedita erunt ac facilia* (Gettiamo adunque questi Elementi come fondamenti in quest' Arte, che poi netto il restante sarà più piano e facile—Vivi felice)."

These MSS. came into the hands of Count Silvio Donati, whose name is on a lozenge on the back of the title-page which it would seem that he, or someone in his employ, had supplied to the Dilucidatio: in the same hand are titlepages for the various "Distributiones," intended to be inserted in their proper places among the plates, with which they were paged continuously; it appears from these that some of the drawings have been lost, for the "Distributio" refers to f. 160 and the last folio is numbered 155: the deficiency is apparent when the printed book is consulted, and also from the index to the drawings, in the same hand.

In its present state the MS. is much cropped: I think it must have been bound by someone into whose hands it came after its possession by the Count: this would explain the misplacing of the titles to the "Distributiones." The titlepage to the entire volume was, as his name on the reverse shows, drawn up when it was in Count Donati's possession: it is in Latin and Italian and runs: "Erudimenta Botanica juxta industria eorum principia Illustrata et delineata a Joanne Baptista Morandi Equite Mediolanensi Beneficio, et utilitati, Plantarum notionem inquirentium." It seems probable that before it was bound this was intended to be prefixed to the "Dilucidatio."

The "eleven sheets of similar drawings of medicinal plants," which were bound in the same volume, are very inferior in interest and execution, and clearly have nothing to do with Morandi.

It may be added that the volume will shortly be rebound in accordance with the above account.

JAMES BRITTEN.

SHORT NOTES.

VALERIANELLA RIMOSA (p. 186). The Rev. E. S. Marshall's hairy-fruited form of this bears at least three names; there are probably others: *V. Auricula* DC. β. *dasycarpa* Rcht. fl. germ. excurs. i. 198 (1831). *V. Auricula* DC. β. *lasiocarpa* Koch, Syn. Deut. Schw. fl. 341 (1838). *V. Auricula* DC. β. *pubescens* Coss. & Germ. fl. env. Paris, 369 (1845). The plant is figured in Reichb. ic. crit. i. f. 130 and Mutel, Fl. fr. xxv. f. 213.—C. E. SALMON.

PÆONIA PEREGRINA Mill. In the description accompanying plate 8742 of the *Botanical Magazine*, Dr. Stapf gives an interesting account of the history of this species, and unravels the confusion which has attended it. The name was published by Miller (Gard. Dict. ed. 8, no. 3), who "appears to have known the plant thus designated by him only from the figures given by earlier writers. There is no example of the species among his specimens in the Banksian herbarium; the only sheet there on which Miller has written the name *P. peregrina* bears two small specimens, both received by him from the Paris Garden; these two specimens belong to two distinct species; neither of the two is the 'red peony of Constantinople,'" under which name Parkinson described and figured it in his *Paradisus* (pp. 342, 343). "One, the more meagre of the two, appears to be but a form of our common garden Peony with quite glabrous leaves; the other represents a type which occurs in the mountains of southern France, and corresponds with *P. monticola* Jordan. Into the pitfall thus prepared the first to stumble was [Sims, who (Bot. Mag. t. 1050)] published as *P. peregrina*, 'upon the authority of the Banksian herbarium,' not the Byzantine plant to which the name belongs, but the plant of Provence and Languedoc which Miller had mistaken for it." Dr. Stapf proceeds to trace the progress of the error, and points out that "as early as 1818 [1817] the right of the plant to rank as a species had been reindicated by [George] Anderson," in Trans. Linn. Soc. xii. 273, "who, overlooking the confusion, renamed it *P. decora*": the name *peregrina*, however, of course stands.

REVIEWS.

A Text-Book of Mycology and Plant Pathology. By John W. Harshberger, Ph.D. With 271 illustrations. London: T. & A. Churchill, 1918. Price 15*s.* net.

A good text-book is of great importance to teachers as well as to students. It is convenient and even necessary for the teacher to have by him a ready reference to the whole field of study; the student and practical worker requires, in the maze of subjects, a guide which he can consult at any moment. Dr. Harshberger in this volume has set himself to provide a text-book that will be useful to teacher and student alike. It is, he tells us, the outcome of twenty-seven years' experience as a teacher of botany, during which time five years were devoted to a course which combined with a study of mycology, "a parallel study of the most important cultural and inoculation methods used by the practical bacteriologist and mycologist at the present day."

In the table of contents we find a well-planned and full *résumé* of the different subjects dealt with.

In presenting a study covering the vast range of subjects included under modern mycology, a judicious choice is necessary if overweight is to be avoided: readers, we are sure, will recognize that though there has been much curtailment, there is no aspect of the study that does not receive a share of attention. In part i. (269 pages) the author has given a general study of Mycology; the other three parts (398 pages) are concerned with plant pathology in all its branches. There are several appendixes in which are set forth a series of laboratory exercises, keys to special fungi groups, advice to collectors, &c.

Under "Mycology" not only the Eumycetes but Bacteria and Myxomycetes are described—a comprehensive arrangement which students of plant pathology will cordially welcome. A shorter account of the nature and classification of Bacteria serves as a guide to the discussion of these organisms as originators of plant diseases. The Myxomycetes, or "slime moulds," have been determined as being more of an animal than a vegetable nature, hence the term "Mycetozoa"; but they have always been of special interest to mycologists, and the nearly related *Plasmodiophora* causes the finger-and-toe disease of turnips. A scab-disease of potatoes, *Spongospora*, is also generally included among slime-moulds.

The higher fungi—Eumycetes—follow next; their physiology, chemistry, histology, &c., receive due consideration, and the various families are passed in review. A general text-book is not the place for systematic work, but in the appendixes, as has been stated, keys to selected families or genera are given as exercises—a method which leaves out large sections while giving undue importance to others; thus we are provided with a key to the species of *Penicillium*, but no guide to the genera of Ascomycetes. We welcome the familiar names in the key to Agaricaceæ and congratulate the author on his adherence to accepted nomenclature.

Much attention is given to fertilization in the different groups, thus recognizing the great work done on the cytology of fungi. The author is somewhat inclined to be dogmatic on subjects concerning which there is as yet no general agreement: in the Ascomycetes he accepts unconditionally a single nuclear fusion in fertilization and brushes aside any other theory; in lichens he asserts that:—"Danilov, Elenkin, Peirce, and Fink show that the dual hypothesis or that of mutualistic symbiosis is untenable," which also is open to question.

The chapters devoted to plant pathology deal in the first place with general matters such as etiology, prophyllaxis, abnormalities—with which is included a glossary of teratological terms,—galls, &c. Specific plant diseases are listed under an alphabetical arrangement of the hosts attacked, with references to standard literature. No book on fungi can claim to be really up to date, and we do not find the bacterial disease of *Citrus*, so frequently mentioned in recent American literature. More generous descriptions of the diseases might have been desired, but the writer has discounted such criticism by declaring that his aim has been "to be directive and helpful rather than to produce a work of encyclopedic value."

The book is copiously illustrated; although prepared primarily for American students, more especially as regards plant-diseases, it will, we are sure, be welcomed and appreciated by mycologists of all countries.

A. L. S.

Flora of the Presidency of Madras. By J. S. Gamble, C.I.E., etc. Part II. Celastraceæ to Leguminosæ-Papilionatæ. 8vo, pp. 201–390. 8*s.* London: Adlard, 1918.

Mr. Gamble, as might be expected, has given us a careful and accurate account of the plants which fall within the compass of this instalment of his work. The plan of the Flora is somewhat novel. Good and rather full descriptions are given of the genera, followed by a clavis of the species occurring within the Presidency; the species are enumerated without further description, but with their geographical distribution, vernacular names, &c. Of course, where such a mass of detail is being dealt with, there is room for differences of opinion, and we do not always find ourselves quite in agreement with the author. Thus, the seventy-five species of *Crotalaria* are placed in various groups—those with trifoliate leaves in the Trifoliatæ, those with generally 5–7 leaflets in the Multifoliatæ. The species in the former group certainly agree in having trifoliate leaves, but in other respects many differ very markedly one from the other: *C. medicaginea* Lam. and *C. trifoliastrum* Willd. have obliquely subglobose small sessile generally 2-seeded pods; *C. orixensis* Rottl. have stalked cylindrical 8–11 seeded pods; *C. striata* DC. has very shortly stalked many-seeded pods; *C. clavata* W. & A. has clavate pods; while *C. laburnifolia* L. has a many-seeded pod with a stalk often about an inch long: the Trifoliatæ as here defined are thus hardly a a very natural group. In *Indigofera* we find no groups are employed, although the first three species—*I. echinata* Willd., *I. linifolia* Retz, and *I. cordifolia* Heyne—are extremely different from one another:

in the first the leaves are simple and the pod is one-seeded, short, recurved, and sickle-shaped; in the second the leaves are also simple and the pod is one-seeded, but it is very small, globose, and smooth; while in the third the pod is oblong and two-seeded. In the *Flora of India* these plants are, we think correctly, placed in three subgenera—the first in *Acanthonotus* Benth., the second in *Sphæridiophora* Desv., and the third in *Euindigofera* Benth. Mr. Gamble defines the *Hedysareæ* as having the "pod jointed if more than one seeded"; but in the clavis to the genera of the tribe it is noted that in some of them, such as *Pycnospora*, with 6–10 seeds, the pod is not distinctly jointed. It is worth considering whether this would not be better placed next to *Crotalaria*, for which, notwithstanding its diadelphous stamens, it certainly has on more than one occasion been mistaken.

This part is entirely the work of Mr. Gamble, with the exception of the analyses and descriptions of *Tephrosia* which are by Mr. J. R. Drummond. We have only to add that it is very neatly printed and remarkably free from typographical errors.

E. G. B.

Plantae Thunbergianae: ein Verzeichnis der von C. P. Thunberg in Süd-Afrika, Indien und Japan gesammelten und der in seinen Schriften beschreibenen oder erwähnten Pflanzen, sowie von den Exemplaren derselben, die im Herbarium Thunbergianum in Upsala aufbewahrt sind; zusammengestellt von H. O. Juel. 8vo, pp. 462. Uppsala: A.-B. Akademiska Bokhandeln. 1917.

The main facts of Carl Peter Thunberg's life, as presented here, can be told in a few words. Born in 1743, at the instigation of the two Burmanns whose acquaintance he had made at Amsterdam, he left Holland at the end of 1770 to amass, as events were to prove, those valuable collections with which his name will ever be associated.

Proceeding first to the Cape of Good Hope then, of course, in Dutch hands, he remained there until 1775. Mr. Juel traces the journeys in South Africa, three in number, the two last in company with Francis Masson, one of Banks's numerous *protégés*. Thunberg's eyes were then turned to Japan, at that time, and not to botanists only, in large measure a *terra incognita*. Trade with Japan was, at the period in question, a monopoly of the Dutch East India Company, and the country, so far as it was open at all, was so to the Dutch alone. The position of ship's doctor gave the Swede his opportunity, and some official journeys into the interior, supplementing his own efforts at the coast, and assistance rendered by Japanese "brother brushes" of the scalpel in return for medical information, enabled him to return to Batavia with much valuable spoil. Thence after a few months he sailed for Ceylon where, for some little time, he botanised in low-lying districts, leaving unvisited the uplands of the interior. He reappeared at Amsterdam towards the end of 1778, and after a short visit to London, where he enjoyed the hospitality of

Soho Square, took up his position at Upsala as successor to Linnæus. From this time till his death in 1828 the long series of books, memoirs and papers—Mr. Juel mentions close on two hundred—standing to his credit is an eloquent testimony to the services he rendered to science.

Mr. Juel finds that of seventy-four genera proposed by Thunberg forty still remain valid—not very encouraging, this, to adventurers in the same field! Many of the proposed species have also naturally been "sunk," as can be seen by consulting the main portion of the book, in which the contents of Thunberg's herbarium are presented in detail, with their modern names attached—a laborious piece of work reaching to close upon four hundred pages. In this the author has played with zeal and devotion the rôle of *vates sacer* to one of the greatest botanists his country has produced.

S. M.

BOOK-NOTES, NEWS, ETC.

William Frederick Miller, the only son of William Miller, whose beautiful line engravings, especially those after Turner, are so well known, was born in Edinburgh on September 18, 1834. He was educated at the High School and for a time worked with his father for a few years; afterwards he went to London, and was for many years manager to Edmund Evans, the engraver and colour-printer who reproduced so much of Caldecott's and Kate Greenaway's work. In 1873 he married and settled at Addiscombe, where he took up botany, his friends being Messrs. Arthur Bennett and H. T. Mennell. His summer holidays were spent in Scotland; the results of his rambles, in the course of which he found *Carex polygama* (*Buxbaumii*) at Arisaig, its only known station in Britain, were communicated by him to this Journal for 1886 (p. 308), 1890 (p. 23), 1895 (p. 345), and 1899 (p. 361); other notes—the first in 1882, the last in 1910—appeared in these pages from time to time. In 1890 he retired from business and settled at Winscombe, Somerset, whence he sent notes on Somerset plants, the most interesting being that of the rediscovery of *Vaccinium Oxycoccus* (Journ. Bot. 1896, 319). In 1904 Miller had a serious accident, from which he never entirely recovered, but his interest in Botany and other subjects remained till the end, which came on April 28th. He gave his British herbarium to the well-known school of the Society of Friends (of which he was a member) at Sidcot, Somerset.

William Black Boyd, who died at his residence, Faldonside, Melrose, on March 16, in his eighty-eighth year, was one of the best-known Scottish amateur gardeners. "For many years," says *The Garden* of March 30, "he had taken a deep interest in alpines, and his collection was one of the finest in the kingdom, embracing many rare plants, old and new, and all cultivated with great assiduity and general success. Saxifrages were among his favourites, and his memory will be upheld by his association with [the hybrid] *Saxifraga Boydii* and its allies . . . . . Snowdrops attracted much of his notice, and he did much to increase our knowledge of the varieties. He was instrumental in discovering the two 'yellow' varieties of *Galanthus nivalis—lutescens* and *flavescens.* He was an earnest member of the British Pteridological Society, and his expert knowledge of British Ferns led to his appointment as judge of these at most of the shows of the Royal Caledonian Horticultural Society." Boyd did a good deal of botanical work, especially in the Grampians. He found the curious little *Sagina Boydii,* which was described by F. B. White in Trans. Bot. Soc. Edinb. xvii. 33 (1887), and was figured in this Journal for 1892 (t. 326 *b*) from specimens sent by the discoverer. Its exact locality has never been accurately ascertained, nor has it since been found: in Trans. Bot. Soc. Ed. (*l. c.*) Boyd writes: "The plant was found among a number of other plants brought by me from Braemar in the autumn of 1878. I do not remember gathering the *Sagina*, and did not remember seeing it till planting out the rest of the collections on that occasion after my return home. In the note accompanying the figure it is stated as Boyd's impression that the plant "was obtained upon Ben A'an, a hill in the deer forest of Invercauld." Mr. Marshall, who stayed with Boyd at Faldonside in 1892, writes: "I think that he was the first to find *Potamogeton angustifolius=Zizii,* in Cauldshields Loch, on or near his property (he showed it to us, there). He was a first-class gardener, and raised several good hybrids; such as *Saxifraga* "Falconside" and *S.* "W. B. Boyd," and *Dianthus alpinus* "W. B. Boyd" if my memory is correct. He grew many interesting native plants, like × *Salix Sadleri* and *Lactuca alpina* with great success. In 1913, the keeper told me, he made the long and tiring ascent to the Glen Spean station for *Saxifraga cespitosa*, and got it!—riding a pony for the lower parts of the expedition." Boyd was a prominent member of the Scottish Alpine Club.

At the meeting of the Linnean Society on 6th June, Mr. C. C. Lacaita gave an abstract of his paper, "A Revision of some critical species of *Echium* as exemplified in the Linnean and other herbaria, with a description of *Echium judæum*, a new species from Palestine." He explained that this paper fell under five divisions: (1) On five critical species of *Echium*, namely, *E. judæum*, sp. n., *E. australe*, Lam., *E. Coineyanum*, sp. n., *E. pycnanthum*, Pomel, and *E. salmaticum*, Lag.; (2) The genus *Echium* in the herbaria of Tournefort, Jussieu, and Lamarck; (3) the *Echia* in Sibthorp's herbarium; (4) The Linnean species; and (5) The *Echia* of Miller's *Gardener's Dictionary* of 1768.

At the same meeting Capt. A. W. Hill showed a series of seedlings of *Cyclamen*. Normally only one cotyledon develops, the other remaining as a rudiment at the apex of the hypocotyl or tuber. If the lamina of the cotyledon be removed, new laminæ arise as outgrowths from the petiole just below the cut surface; but if the cotyledon with its petiole be removed, the rudiment of the second cotyledon is stimulated to develop into an assimilating organ. On removal of the lamina of this second cotyledon new laminæ will be formed from the inner edges of its petiole close to the apex exactly as is the case with the cotyledon proper. When plumular leaves are so treated no new laminæ are regenerated. Further cotyledon leaf-cuttings will produce roots from the base of the petiole, while plumular leaf-cuttings remain rootless.

Mr. Robert Paulson gave an account of a joint paper by himself and Mr. Somerville Hastings, "On the Relationship between the Symbionts in a Lichen," illustrating his remarks with a series of thirty lantern-slides. A summary of the investigation may be made by reference to *Cladonia digitata*, Hoffm., the lichen which has been used as material for many of our preparations. This plant grows at the base of trees in shady woods in Hertfordshire and Essex as well as in most northern localities. In the southern counties just mentioned it is luxuriant and fertile, though not abundant. The gonidium is spherical, except when subject to pressure from other gonidia. The diameter of fully-developed cells ranges from 8 to 15 μ; the chloroplast in the mature gonidium has an uneven surface; after fixing and staining, minute reticulation of the cytoplasm is evident; the so-called pyrenoid is large and central, and exhibits a distinct structure throughout the substance, its diameter is roughly one-third that of the chromatophore; a small lateral body stains darker than the pyrenoid, it is very conspicuous in many of the preparations surrounded by a very lightly stained area. Twin gonidia frequently occur; there is no vegative cell-division of the gonidium; the increase in the number of gonidia results from the formation of autospores, reduced zoogonidia; there is no penetration of gonidia by hyphæ.

THE first paper in *The Annals of the Phytopathological Society in Japan*, is devoted to a history of the development of Phytopathology in that country and in China from the earliest times—insect pests were recorded in Chinese History in 1100 B.C., and the account of frost damage to plants was written in 48 B.C. Other instances proving the practical interest taken in the subject at an early period are included in the brief survey. This paper and some others are printed in English; one, on Anthracnose of *Euonymus*, is in German, the other contents are in Japanese. The pages printed in Japanese type are closed to most of us, but the Journal, which is issued from Tokio, should have a successful career in its native country.—A. L. S.

THE *Kew Bulletin* issued in May (1918, n. 4) contains an interesting paper on *Rosa glutinosa* by Mr. R. A. Rolfe, who shows that the plant "long cultivated and recently figured (Willmott, Rosa, p. 467)" under that name "does not agree with the original *R. glutinosa* Sibth. & Sm.," of which an authentic specimen exists in the National Herbarium and in the Sibthorpian Herbarium at Oxford. The same number contains a paper on "The Microconidia of *Botrytis cinerea*," by Mr. W. B. Brierley; a revision of *Taxotrophis* and *Balanostreblus* by Mr. J. Hutchinson, in which two new species of the former genus are described; and an account of the late Major Sidney Miles Topping, who (1878–1917) was killed near Ypres in

September last, and whose collections, mainly from the neighbourhood of Chitral, have been bequeathed to the Kew Herbarium.

As an example of the fictions which have grown up round the Primrose League, of which we gave the authentic history in our March issue (p. 89) the following from an anonymous work—*Further Indiscretions*—lately published, may be cited: "The way Primroses became connected with Lord Beaconsfield was through Queen Victoria, who had an admiration for him, sending him boxes of the little flowers gathered from the slopes of Windsor Castle or from Osborne" (p. 224).

Mr. F. O. Mosely is publishing a work at Reading, *Fungoid and insect Pests and their Control*, of which the first part (price 1*s.*) has reached us. Fungoid parasites and insect pests are described promiscuously, and are illustrated more or less effectively by coloured prints. With the serious threat of world-famine, it has become tremendously important to increase and conserve our food-plants: by describing and depicting their common pests in a popular manner, and by giving advice as to treatment, the author is rendering timely assistance to growers. We are astonished to find that the work is unpaged and the figures unnumbered: this of course seriously hampers any future reference, and a final index will be impossible.—A. L. S.

The *Journal of the Kew Guild* for 1918 has felt the stress of the times and appears in a much diminished size. The obituary notices, which form its most generally interesting feature, are mainly concerned with Kewites who have fallen in the War; they include a portrait of M. B. Scott, of whom a short account was given in our last year's issue (p. 263). The number contains a biography, with portrait, of Mr. James A. Gammie, the President of the Guild for 1918.

The *Botanical Gazette* for January contains a full and interesting biography, accompanied by two portraits, of Dr. Charles Horton Peck (1839–1917), from the pen of Prof. G. F. Atkinson, of Cornell University. He was best known in connection with his taxonomic studies and publications on fungi, in connection with which he early became acquainted with M. C. Cooke, who collaborated with him in the description of numerous species published jointly under their names.

The most recent issue (vol. vi. no. 7) of the *Records of the Botanical Survey of India* is devoted to a paper on the plants of Northern Gujarat, in the Bombay Presidency, by Messrs. W. T. Saxton and L. J. Sedgwick, considered in relation to the late Theodore Cooke's Flora of the Presidency. Besides a list of the phanerogams, of which 613 are enumerated, there is a section on the ecology of the district—a novel feature in the *Records*—based on Warming's classification: 95 per cent. of the flora are psammophytes and psilophytes, the remainder being divided among hydrophytes, helophytes, halophytes, lithophytes, and mesophytes. The subdivisions of the groups are carefully worked out, and the paper is a valuable contribution to our knowledge of Indian ecology.

ALABASTRA DIVERSA.—PART XXIX.

By SPENCER LE M. MOORE, B.Sc., F.L.S.

(Concluded from p. 212.)

4. COMPOSITÆ AFRICANÆ ULTERIORES.

SENECIONIDEÆ.

Emiliella, gen. nov *Capitula* parvula, homogama, disciformia, flosculis omnibus verisimiliter fertilibus. *Involucrum* ecalyculatum, cylindricum, phyllis 1-seriatis inferne connatis superne liberis. *Receptaculum* planum, nudum. *Corollæ* tubulosæ, limbo 5-lobo. *Antheræ* basi obtusæ, integræ. *Styli* rami complanati, truncati, penicillati. *Achænia* (matura haud visa) comparate elongata, linearia, apice paullulum angustata, glabra. *Pappus* e squama unica unilateraliter affixa integra bifida vel lacerata sistens.—Herba parva, annua. *Caulis* simplex vel pauciramosus. *Folia* alterna. *Capitula* minima, vultu *Emiliæ*, ad apicem ramorum 2–3-na, pedunculata. *Corollæ* violaceo-cyaneæ, 5-meræ.

Emiliella exigua, sp. unica. *Caule* tenero piloso-pubescente; *foliis* paucis basalibus exiguis ovatis obtusissimis sat longe graciliterque petiolatis superioribus sessilibus etsi basi longe petiolatim extenuatis oblongo—vel anguste ovato—spathulatis obtusis vel obtusissimis margine sparsim dentatis membranaceis utrobique puberulis vel fere glabris; *capitulis* 8-flosculosis pedunculis filiformibus capitula interdum excedentibus insidentibus; *involucri* phyllis 6 lineari-oblongis obtusis glabris; *corollis* (sec. cl. detectorem violaceo-cyaneis) in sicco dilute roseis; *achæniis* quam corollæ longioribus obscure costatis; *pappi* squama lineari vel lineari-lanceolata plerumque corollæ tubo circiter æquilonga.

Angola, along the Cubango in moist situations; *Gossweiler*, 2093.

Planta 6–8 cm. alt. Folia infima 4–6 × 3–4 mm., horum petioli 4–5 mm. long.; folia vetustiora 1·5–3 cm. long. (pars petioliformis ± 1 cm.), 4–6 mm. lat., in sicco viridia. Pedunculi ± 5 mm. long. (2–9 mm.), puberuli. Capitula 6·5 × 2 mm. Involucrum 5 mm. long. Corollæ vix usque medium divisæ, in toto 2·5 mm. long. Styli rami ·3 mm. long. Achænia (valde cruda) 4 × ·3 mm. Pappi squama 1·25–fere 2 mm. long.

A curious little plant distinguished from *Senecio* and its allied genera by the singular pappus crowning the relatively long achenes.

Gynura eximia, sp. nov. Planta herbacea, elata; *caule* erecto robusto sursum pauciramoso fistuloso prominenter longitrorsum striato uti ramuli puberulo; *foliis* inferioribus amplis sessilibus auriculato-amplexicaulibusque ambitu obovatis lyrato-pinnatifidis apicem versus gradatim angustatis apice obtusis lobis paucis triangularibus ovatisve obtusis vel obtusissimis integris vel denticulatis membranaceis utrobique præsertim in nervis pag. inf. puberulis vel fere glabris foliis ramulorum breviter lobatis vel undulatis basi in petiolum sat longum extenuatis; *capitulis* homogamis ∞-flosculosis corymbum oligocephalum ramulos terminantem bracteatum efficientibus; *bracteis* inferioribus lanceolatis basi lobatis superioribus lineari-lanceolatis integris summis in calyculi phylla pauca linearia transeuntibus; *involucri* anguste campanulati phyllis 13 oblongis acutiusculis apice ipso pubescentibus dorso striatulis puberulisque margine firme scariosis ima basi connatis ibique dense pubescentibus; *corollis* breviter exsertis tubo basi dilatato inde anguste cylindrico superne infundibulari; *styli* ramis exsertis; *achæniis* subcylindricis curvulis apice subito ampliatis 10-costatis glabris; *pappi* setis scabriusculis albis.

Angola, along rivulets in moist shrubby situations at Kaconda; *Gossweiler*, 3638.

Planta plusquam bimetralis (8 ped. alt.). Caulis usque 5–8 mm. lat., in sicco brunneus. Ramuli compressi, circa 2 mm. lat. Folia inferiora 12–14 × 5·5–8 cm., in sicco brunnea, subtus pallidiora; horum lobi sæpius 1–2 cm. long., ±1 cm. lat.; costæ laterales utrinque circa 7, parum vel minime arcuatæ, integræ vel marginem versus dichotomæ; folia superiora (petiolo 2–3 cm. long. excluso) 6–8 × 2–3 cm., basi sæpe obliqua. Corymbus saltem 15 cm. long.; bracteo vetustiores 1–2 cm. long., juniores ±6 mm. Pedunculi proprii 1·5–4 cm. long. Capitula pansa 14 × 12 mm. Involucri phylla viva purpurea, 11 mm. long., calyculi 5–6 mm. Corollæ aurantiacæ; tubus 10 mm., lobi 1·25 mm. long. Styli rami 2 mm. long. Achænia 4 mm. long., ·5 mm. lat. apice ·75 mm., sordide alba.

To be referred here is *Gossweiler* No. 4315 from marshes of the Seculu river near Kaconda, with somewhat smaller leaves.

The species is known among its African congeners by the large prominently lobed amplexicaul leaves together with the large heads.

Crassocephalum Gossweileri, sp. nov. Herba sesqui-bispithamea glabra; *caule* sat gracili sparsim ramoso nunnunquam simplici in nodis aliquantulum anfractuoso; *foliis* sessilibus linearibus vel lineari-oblongis obtusis vel acutis basi obtusis obscureque decurrentibus integris membranaceis; *capitulis* homogamis ∞-flosculosis caulem et ramulos solitatim terminantibus longipedunculatis pedunculis sparsim bracteatis; *involucri* anguste campanulati phyllis 8 oblongis apice acutis vel obtusis necnon pubescentibus alibi glabris dorso inconspicue striatis margine anguste scariosis; *corollis* violaceo-rubris ex involucro eminentibus tubo anguste infundibulari; *genitalibus* sursum exsertis; *styli* ramis elongatis; *achæniis* oblongis compressiusculis 5-costatis glabris; *pappi* setis scabriusculis albis.

Angola, Cuito, "Mumua" woods of the Campulua valley; *Gossweiler*, 2797.

Folia pleraque 4·5–7 cm. long., 2–4·5 mm. lat., in sicco griseoviridia; costa media pag. inf. eminens, costis lateralibus paucis, obscuris. Pedunculi 12–20 cm. long. Bracteæ inferiores 12–20 mm. long., superiores usque 1–4 mm. reductæ. Capitula pansa 12 × 12 mm. Involucrum 8–9 × 6 mm.; phylla basin versus diutule inseparabilia, nunc 1·5–2 mm. nunc 1 mm. tantum lat. Corolla tota 10 mm. long.; tubus 7 mm., ima basi paullulum dilatatus. Styli rami 3·5 mm. long., horum appendix filiformis sola 2 mm. long. Achæniis 4 mm., pappi setæ 4–5 mm. long.

The species can be recognised by the narrow leaves combined with the long peduncles and broad involucral leaves. Its general appearance is that of an *Emilia*.

Crassocephalum radiatum, sp. nov. *Caule* simplici sat gracili ascendente fere a basi subremote folioso glabro; *foliis* petiolatis lanceolatis obtusis vel obtuse acutis basi in petiolum extenuatis margine dentatis basique interdum latere utroque semel lobulatis summis perpaucis equidem interdum basi auriculatis tenuiter membranaceis glabris; *capitulis* heterogamis radiatis circa 60-flosculosis corymbum laxum oligocephalum (2–4) efficientibus; *pedunculis* propriis tenuibus capitula bene excedentibus; *involucri* tubuloso-campanulati scabriusculi phyllis circa 13 lineari-oblongis acutis apice sphacelatis; *calyculi* phyllis pluribus linearibus involucro multo brevioribus; *ligulis* 8 ex involucro longe eminentibus; *styli* ramis appendice filiformi auctis; *achæniis* hucusque minime maturis cylindricis obscure costatis minute setulosis; *pappi* setis scabriusculis albis.

Belgian Congo, Pueto (Mpueto) near Lake Moero under trees; *Kassner*, 2825.

Folia pleraque 3–4 × 1–1·5 cm., in sicco læte viridia, horum auriculæ parvulæ, 2–3 mm. long.; petioli 5–7 mm. long. Corymbus usque ad 6 × 3 cm. Pedunculi proprii 1·5–3·5 cm.; bracteæ anguste lineares, ± 8 mm. long. Capitula aliquanto cornua, pansa fere 1 cm. diam. Involucrum 5 × 4 mm. Calyculi phylla 1·5–2 mm. long. Ligula (lamina sola) 6 × 2 mm., apice obscure retusa, 5-nervis. *Corollæ* fll. disci 6 mm. long. Andrœcium pro parte exsertum. Styli rami 1 mm. long., appendice ·3 mm. haud exempta. Achænia vix 1 mm., pappus 5 mm. long.

A remarkable species owing to its radiate heads. It has been called by de Wildeman and Muschler (*l. c.* p. 174) *Senecio purpureus* L., an entirely different plant.

Senecio (§ ANNUI) **coloniarius**, sp. nov. Caule erecto inferne nudo superne ramoso foliosoque pubescente dein glabrescente; *foliis* sessilibus oblongis vel oblongo-lanceolatis obtusis basi obtusis interdum breviter auriculato-amplexicaulibus integris vel fere integris pubescentibus puberulisve; *capitulis* parvis homogamis disciformibus circiter 20-flosculosis in corymbum laxum elongatum bracteatum ordinatis; *involucri* oblongi glabri phyllis 8 oblongis obtusis dorso 3–5-striatis margine anguste scariosis calyculi phyllis 0; flosculis flavis brevissime exsertis; *styli* ramis truncatis penicillatis; *achæniis* cylindricis 5-costatis leviter setulosis; pappi setis scabriusculis albis.

Angola, in rocky treed situations at Kimbundo Jamaiambe (between the Kutchi and Kutato rivers); *Gossweiler*, 2951.

Planta 2–5-spithamea. Folia pleraque 2·5–5 cm. long., 3–6 mm. lat., interdum margine paucidenticulata, summa minora in bracteas transeuntia. Corymbus 10–30 × 6–16 cm.; hujus bracteæ lineares inferiores usque 15 mm. long., summæ modo 2 mm.; pedunculi proprii plerumque 1·5–2 cm. long., glabri. Capitula 6 × 2 mm. Involucri phylla 5·5 mm. long. Corollæ 5-lobæ, infundibulares, in toto 4·5 mm. long. Styli rami ·65 mm. long. Achænia (vix matura) 2 mm., pappus 3 mm. long.

S. abyssinicus Sch. Bip. with dissimilar foliage and radiate heads is a close ally of this, which Mr. Gossweiler notes as appearing "always in colonies, but only in few localities"—hence the trivial name.

Senecio (§ Plantaginei) **adustus**, sp. nov. *Caulibus* e rhizomate crasso cæspitosis semispithameis simplicibus subdistanter foliosis puberulis; *foliis* radicalibus longe valideque petiolatis caulinis parvis sessilibus linearibus obtusis puberulis; *capitulis* sat magnis solitariis terminalibus homogamis discoideis ∞-flosculosis; *involucri* hemisphærici glabri phyllis 20 anguste lineari-lanceolatis acuminatis dorso carinatis margine scariosis additis paucis lanceolatis vel etiam ovato-lanceolatis acuminatis calyculum efficientibus; *corollis* 5-meris albis exsertis tubo gracili sub apice campanulatim dilatato; *genitalibus* exsertis; *styli* ramis truncatis penicillatis; *achæniis* (nondum maturis) oblongis glabris; *pappi* setis leviter scabriusculis albis.

Benguella, common in the moist depression east of Keiando, along the carriers' path to Boca Varaquanha, and in open primary woods near the Cubal rivulet in company of two perennial Proteaceæ; *Gossweiler*, 1749.

Rhizoma circa 1 cm. crass. Foliorum radicalium petiolus saltem 15 cm. long., prominenter striatus; limbus ——. Caules 10–12 cm. alt., sat graciles; horum folia 1–1·5 cm. long., 2–4 mm. lat., summa capitulum fere attingentia. Capitula pansa circa 18 × 18 mm. Calyculi phylla 5 mm. long., 2·5–4 mm. lat. Involucri phylla 15 mm. long. Corollæ tubus basi leviter ampliatus, pars angusta 12 mm. long., pars campanulata 2·5 × 2·5 mm.; lobi triangulares, obtusi, 1·5 mm. long. Andrœcium fere usque 2 mm. exsertum. Styli rami 2 mm. long. Achænia 2 mm., pappus 10 mm. long.

To be inserted in the genus near *S. albanensis* DC., but too distinct to require particulars.

The radical leaves are represented only by the rigid persistent portions of their stalks, which have evidently been subjected to the action of fire. Mr. Gossweiler's note states that the flowering stems spring up after the "queimadas" or bush-fires have passed over the habitat.

Senecio (§ Paucifolii) **dumeticolus**, sp. nov. Herba perennis, trispithamea; *caule* ascendente simplici a basi bene foliato laxe araneoso; *foliis* paucis inferioribus ovato-spathulatis obtusissimis vel obtusis basi sat longe lateque petiolatis caulemque breviter amplectentibus foliis ceteris sessilibus amplexicaulibus obovatis vel obovato-oblongis obtusis omnibus margine crebro dentatis membranaceis glandulisque inimmersis translucentibus præditis necnon hac atque illac præsertim in costa centrali breviter araneosis junioribus in bracteas transeuntibus; *capitulis* homogamis disciformibus 22-flosculosis in corymbum polycephalum foliis longiorem araneosum ordinatis; *involucri* cylindrico-turbinati leviter araneosi phyllis 8 oblongis obtusis apice sphacelatis dorso striatis margine late vel anguste scariosis additis calyculi phyllis paucis subulatis; *flosculis* exsertis aurantiacis; *styli* ramis truncatis penicillatis; *achæniis* oblongis aliquanto compressis 5-costatis dense etsi breviter setulosis; *pappi* setis scabriusculis albis.

Angola, woods near Forte Princeza Amelia; *Gossweiler*, 2491.

Rhizoma 7–12 mm. crass., radices paucos validos emittens, foliorum infimorum reliquiis circumdatum. Folia infima 8–18 cm. long. (petiolo 3–4 cm. incluso), 2–4 cm. lat.; cetera ±10×3 cm., hæc interdum leviter panduriformia, omnia in sicco griseo-viridia pallideque nitida; costæ laterales plures, uti reticulum maxime laxum pag. utravis bene visæ etsi teneræ; folia summa modo 3–5 cm. long. Inflorescentia 20–30×6–10 cm. Bracteæ infimæ 15 mm., summæ circa 3 mm. long. Pedunculi proprii ±2 cm. long. Capitula pansa 11×7 mm. Involucrum 6×4 mm.; calyculi phylla circa 2·5 mm. long. Corollæ in toto 8 mm. long., dimidio inf. cylindricæ, sursum campanulatæ breviterque 5-lobæ. Andrœcium apice exsertum. Styli rami exserti, ægre 1 mm. long. Achænia 2 mm., pappus 6·5 mm. long.

Easily distinguished from *S. isatideus* DC., by the prominently reticulate leaves and the broader capitula with many more florets to each. It is nearer *S. brachyantherus* (*Othonna brachyanthera* Hiern), which, with somewhat dissimilar foliage, has involucres and capitula in many respects unlike.

No. 2376 from the same district is evidently conspecific with this.

Senecio (§ PAUCIFOLII?) **kacondensis**, sp. nov. Herba perennis, erecta, elata (fere 3-orgyalis), glabra; *caule* valido fistuloso prominenter costato; *foliis* inferioribus magnis obovato-oblanceolatis inferne longe attenuatis (igitur quasi petiolatis) apice obtusis basi decurrentibus margine creberrime dentatis firme membranaceis foliis superioribus gradatim diminutis lineari-lanceolatis basi obtusis summis in bracteas transeuntibus; *capitulis* majusculis heterogamis radiatis ∞-flosculosis corymbum elongatum pluriramosum sparsim bracteatum referentibus; *bracteis* linearibus acutis; *pedunculis* propriis involucra sæpissime excedentibus; *involucri* campanulati phyllis 13 oblongis obtusis apice sphacelatis barbellatisque dorso perspicue striatis margine scariosis additis pluribus lineari-lanceolatis acutis calyculum constituentibus; *ligulis* 7 bene exsertis flavis; *corollæ* disci exsertis; *styli* ramis truncatis penicillatis; *achæniis* oblongis 5-costatis glabris; *pappi* setis quam achænia paullo brevioribus scabriusculis albis.

Angola, along the river near Kaconda in marshy situations; *Gossweiler*, 4239.

Caulis inferne 1 cm. crass. Folia inferiora 50×11 cm., in sicco griseo-viridia, subtus leviter pallidiora; costa media pag. inf. eminens; costæ laterales utrinque circa 20, pag. inf. visibiles interjectis aliis minoris valoris; folia superiora 5–10 cm.×7–10 mm. Inflorescentia 30×20 cm. Bracteæ inferiores 2–2·5 cm., summæ ±5 mm. long. Capitula pansa 1·5×2 cm. Involucrum 11 mm. long.; calyculi phylla 4–6 mm. Ligulæ late oblongæ, apice tridentatæ, nervis 8 percursæ. Disci corollæ 5-meræ, infundibulares, 10 mm. long. lobis 1 mm. long. inclusis. Styli rami 1·5 mm. long. Achænia 5–5·5 mm., pappus 8 mm. long.

The radical leaves, if any, were not seen, but the affinity being apparently with *S. tabulicolus* Baker, which has none, the chances are in favour of this proving a member of § *Paucifolii*.

Except that the florets are said to be pale blue, there seems no difference between the above and No. 3577 from the river Kuebe near Munonque.

Senecio (§ Rigidi) **vicinus**, sp. nov. Herba perennis, sat elata; *caule* erecto inferne nudo superne bene folioso striato leviter araneoso dein glabro; *foliis* oblongo-lanceolatis obtusis basin versus petiolatim coartatis ima basi amplexicaulibus indeque optime decurrentibus margine integris firme membranaceis supra leviter araneosis deinde glabrescentibus subtus griseo-tomentosis junioribus linearibus summisque in bracteas transeuntibus; *capitulis* heterogamis radiatis fere 50-flosculosis corymbum amplum multiramosum bracteatum pluricephalum hac atque illac obscure araneosum constituentibus; *involucri* campanulati glabri phyllis 13 oblongis acutis apice leviter sphacelatis dorso striatis margine sat late scariosis; *ligulis* 10 luteis ex involucro plane eminentibus; *radii* flosculis breviter exsertis; *styli* ramis truncatis penicillatis; *achæniis* (crudis) subcylindricis (basin versus levissime angustatis) 5-costatis, glabris; *pappi* setis scabriusculis albis.

Angola, moist grassy marshes on bank of river Kuelai near Masaca; *Gossweiler*, 3073.

Rhizoma ± 5 mm. crass., copiose fibrillosum. Caulis fere 10 dem. alt., 4 mm. crass., griseo-brunneus. Folio pleraque 7–10 cm. × 8–14 mm., horum pars petioliformis ± 1 cm. long., in sicco grisea; superiora circa 4 cm. × 5 mm. Inflorescentia usque 30 × 18 cm.; bracteæ lineares, 3–8 mm. long. Pedunculi proprii filiformes, 1–2 cm. long. Capitula pansa 6 × 8 mm. Involucrum 5 mm. long. Ligulæ oblongæ, obscure 3-denticulatæ, 4-nerves, 3 mm. long. Corollæ disci infundibulares, in toto 6 mm. long., harum lobi 5, ægre 1 mm. long. Antheræ fere omnino exsertæ. Styli rami ·5 mm. long. Achænia 2 mm., pappus 5 mm. long.

Near *S. serratuloides* DC.; the entire leaves tomentose on the lower face serve to distinguish it on sight; the longer involucral leaves of *S. vicinus* would also at once attract notice.

Senecio (§ Rigidi) **katubensis**, sp. nov. Planta ultra bispithamea; *rhizomate* villoso copiose fibroso reliquiis foliorum evanidorum obducto; *caule* erecto fere a basi paucifolioso striato obscure araneoso; *foliis* sessilibus oblongis obtusis basi amplexicaulibus decurrentibusque margine dimidio distali crebro dentatis vel denticulatis ceterum integris vel fere integris firme membranaceis glabris summis gradatim imminutis in bracteas transeuntibus; *capitulis* heterogamis radiatis ultra 70-flosculosis corymbum terminalem bracteatum laxe oligocephalum referentibus; *bracteis* linearibus acutis summis capitulum appropinquantibus minoribus; *involucri* campanulati ima basi leviter araneosi alibi glabri phyllis 20 oblongis acutis apice ipso pubescentibus sphacelatisque dorso carinatis medioque canaliculatis additis calyculi phyllis perpaucis anguste linearibus sat elongatis; *ligulis*

8 verisimiliter flavis exsertis; *corollis* disci subinclusis; *styli* ramis truncatis penicillatis; *achæniis* cylindricis 5-costatis breviter denseque setulosis; *pappi* setis glabris albis.

N.W. Rhodesia, Katuba stream under trees; *Kassner*, 2254, 2255.

Folia 5–8 cm. long., 5–10 mm. lat., in sicco griseo-viridia, pauca summa usque 2·5–4 cm. reducta. Inflorescentia circa 10 × 4·5 cm.; hujus bracteæ 5–15 mm. long. Pedunculi proprii 2–5 cm. long. Capitula pansa 10 × 12 cm. Involucrum in sicco fuscum, 9 mm. long. Ligulæ anguste oblongæ, apice brevissime 3-denticulatæ, 7-nerves sub apice 5-nerves, 11·5 mm. long. Corollæ disci infundibulares, in toto 7·5 mm. long.; lobi 5, ·75 mm. long. Andrœcium semiexsertum. Styli rami 1 mm. long. Achænia 2·5 mm., pappus 7 mm. long.

Distinguished from the foregoing by several features of foliage and flower.

Senecio (§ Rigidi) **kuluensis**, sp. nov. Herbaceus, perennis; *rhizomate* satis valido villosulo copiose radicante; *caule* simplici ascendente a basi folioso araneoso-piloso vel fere glabro; *foliis* sessilibus oblongis vel oblongo-lanceolatis obtusis acutisve basi breviter amplexicaulibus margine crebro calloso-dentatis firme membranaceis sparsim araneoso-pilosis; *capitulis* paucis mediocribus homogamis disciformibus corymbum elongatum bracteatum efficientibus; *bracteis* lineari-lanceolatis acutis junioribus linearibus in calyculi phylla perpauca transeuntibus; *involucri* subhemispherici præsertim basi araneosi phyllis 24 lineari-oblongis superne angustatis apice barbellatis dorso carinatis margine anguste scariosis; *corollis* exsertis luteis; *styli* ramis truncatis penicillatis; *achæniis* oblongis pluricostatis setulosis; *pappi* setis scabriusculis albis.

Angola, in thickets at Kului; *Gossweiler*, 2911.

Planta bispithamea. Folia plerumque 4–6 cm. long., 8–10 mm. lat., summa longit. adusque 2·5–3 cm. diminuta, in sicco viridia. Pedunculi proprii 8–20 cm. long. Bracteæ inferiores 1–2 cm. long., superiores ±7 mm. long. Capitula pansa 12 × 12 mm. Calyculi phylla 3–6 mm. long. Involucri phylla basi brevissime connata, 8 mm. long. Corollæ infundibulares, 6·5 mm. long. Achænia adhuc cruda aliquanto compressa, 3–3·5 mm. long., pappus 6 mm.

A species seemingly very distinct from any other of its section.

To be referred here is *Gossweiler*, 2926, also from Kului.

Senecio (§ Scandentes) **callimocephalus**, sp. nov. Herbaceus, verisimiliter semiscandens, glaber; *caule* sat valido sparsim ramoso distanter folioso eximie pluristriato; *foliis* sessilibus late obovatis basi longiuscule extenuatis apice obtusis margine dentatis raro lobulatis tenuiter crassiusculis; *capitulis* inter minores homogamis disciformibus 11–13-flosculosis in corymbos paniculatos palycephalos bracteatos folia plane excedentes digestis; *pedunculis* propriis involucra circiter æquantibus sat crebro bracteatis; bracteis oblongis acutis vel obtusis; *involucri* anguste oblongo-obovoidei phyllis 6 late oblongis obtusis apice leviter barbellatis margine anguste scariosis; *corollis* flavis exsertis; *styli* ramis truncatis penicillatis; *achæniis* oblongo-turbinatis obscure costatis glabris; *pappi* setis scabridis albis.

Rhodesia, Victoria; *Monro*, 1956.

Folia majora 4×2·5 cm., minora (præsertim ramulis insidentia) 1·5–3 cm.×7–12 mm. Inflorescentia ±10×8 cm.; pedunculi primarii plerumque 4–6 cm. long., ordinis secundi patentes, 1–2·5 cm.; pedunculi proprii teneri, ±4 mm. long. Bracteæ vetustiores ±4 mm. long., juniores circa 2 mm., pedunculorum propriorum circa 1 mm. long. Capitula pansa 7×5 mm. Involucrum 4·5 mm. long., calyculi phylla ±1 mm. Corollæ infundibulares, 5-loba, 5·5 mm. long. Styli rami 1 mm. long. Achænia (hucusque minime maturæ) 1–1·2 mm., pappus 5 mm. long.

Readily known from *S. deltoideus* Less. by the foliage.

HELIANTHOIDEÆ.

Wedelia Gossweileri, sp. nov. *Caule* sat valido sursum pauciramoso uti rami distanter foliosi scabro; *foliis* amplis superioribus gradatim imminutis petiolatis ovatis acuminatis apice ipso acutis basi aliquanto obliquis cuneatis margine indurato-serratis membranaceis utrobique piloso-pubescentibus; *corymbis* ad apicem ramulorum laxe oligocephalis bracteis foliaceis præditis pedunculis propriis pubescentibus longit. capitula manifeste superantibus fultis; *involucri* campanulati 2-serialis phyllis exterioribus oblongo-lanceolatis acutis inferne paucistriatis fere glabris superne foliaceis hispideque scabridis phyllis interioribus quam exteriora brevioribus ovato-oblongis breviter acuminatis striatis membranaceis superne microscopice puberulis; *receptaculi* paleis quam involucri phylla int. longioribus apice incisis; *flosculis* paucis ligulis abbreviatis verisimiliter albis; *achæniis* oblongis subtrigonis microscopice rugulosis glabris; *pappi* aristis 2–3 quam achænia brevioribus barbellatis.

Angola. Libolo; *Gossweiler*, 6388.

Foliorum limbus 10×5 cm., sæpius vero 7–8×3 cm.; petioli foll. inf. adusque 4 cm. long., foll. sup. ±1 cm. Bracteæ ±2 cm. ×6 mm. Corymbus circa 7 mm. long. Pedunculi proprii summum 3 cm. long. Involucri phylla ext. 9 mm. long., int. 7·5 mm. Receptaculi paleæ 9 mm. long. Ligulæ oblongo-obovatæ, bidentatæ, 1·5 mm. long. Radii corollæ 4 mm. long. Achænia fusca, 5·5 mm. long.; pappi aristæ rigidæ, 2·5–3 mm. long.

Among the salient features of this species are the ample lengthily petioled leaves and the short ligules.

MUTISIACEÆ.

ERYTHROCEPHALUM CAUDATUM, sp. nov. Adusque bispithameum vel paullo altius; *caule* verisimiliter decumbente pauciramoso satis valido in longitudinem optime striato bene foliato laxe araneoso pilisque articulatis villosulo; *foliis* sessilibus obovatis vel obovato-oblongis acutis obtusiusculisve basin versus coartatis basi breviter amplexicaulibus margine calloso-denticulatis pag. sup. mox fere glabris pag. inf. laxe araneosis; *capitulis* homogamis ∞-flosculosis solitariis terminalibus pedunculo folia subæquanti vel quam se breviori impositis; *involucri* circa 5-serialis subhemisphærici leviter

araneosi phyllis ext. superne angustatis necnon optime caudato-extenuatis margine ciliato-denticulatis interioribus plane brevioribus lanceolato-oblongis acutis apicem versus ciliatis intermediis apice eroso-cristatis; *receptaculi* paleis involucri phyllis intimis similibus; *flosculis* breviter exsertis omnibus actinomorphis; *achæniis* hucusque crudis cylindricis pubescentibus; *pappi* setis perpaucis pubescentibus.—*E. nutans* de Wild. & Muschler, *l. c.* 179, non Benth.

Belgian Congo, Lusaka; *Kassner*, 2890.

Folia pleraque 8–10 × 3·5–5 cm. Pedunculus usque ad 10 cm. long., sed sæpe brevior. Capitula pansa 2·2 × 4 cm. Involucri phylla extima summum 2·5 cm. long., basi 3 mm. lat., superne adusque 1 mm. angustata; phylla intermedia 1·5 cm., interiora 1 cm. long. Corollæ tubus angustus, 7 × ·5 mm., inde subito dilatatus; lobi lineari-lanceolati, obtusi, 4·5 mm. long. Andrœcium breviter exsertum; antheræ 4·5 mm. long. harum caudis 1·2 mm. long. exemptis. Styli rami clavellati, recurvi, 2 mm. long. Achænia circa 2 mm. long.; pappi setæ dilute stramineæ, 5–9 mm. long.

Can be distinguished at a glance by the elongate leaves of the involucre; the other homogamous species differ in many important respects. *E. nutans* Benth. is an Eastern rayed species somewhat like *E. caudatum* in foliage, but in other characters diverse.

PEDINOPHYLLUM PYRENAICUM (SPRUCE) LINDB.

BY W. H. PEARSON, A.L.S.

In my notes on *Pedinophyllum interruptum* (Hep. Brit. i. p. 271) I expressed the opinion that the var. *pyrenaicum* was "only sportive, as stems which might be described as it are found also on the normal form." Carrington arrived at this conclusion years ago, and Spruce, who first noticed it, in later years had no great confidence in its specific or varietal value. Some time ago I received from Mr. J. Hunter a rich collection of hepatics from Donegal, amongst them being fine specimens of what I now consider typical *P. pyrenaicum*.

Lindberg (Not. Salls. F. et F. Fen. For. xiii. p. 36, 1874) considered *P. pyrenaicum* the most perfect form of *P. interruptum* (Nees) and reduced the latter to a variety of the former, a view with which I am not able to agree and from which Schiffner also dissents (Schiffn. Hep. Eur. Exsicc. n. 238). Both species are well developed and are perfect in themselves. The only objection to their being regarded as distinct species is the fact that some forms of *P. interruptum* approach *P. pyrenaicum* in some of their leaves being bidentate. If we knew nothing of intermediate forms and were to compare the usual normal *P. interruptum* with the Donegal specimens we should have little hesitation in considering them specifically distinct.

P. pyrenaicum is a much larger plant, of a more delicate texture than *P. interruptum*, having leaves bidentate, rarely tridentate, stipules often bifid, bracts bi-tri-dentate, mouth of perianth spinulose-denticulate; whereas *P. interruptum* is a smaller, more robust plant, with entire leaves and bracts, the mouth of perianth having a few coarse large teeth. It is true that on what I should call typical *P. pyrenaicum* there are to be found entire leaves, and that the specimens distributed in Massalongo's Hep. It. Ven. n. 79 as *Plagiochila interrupta* var. *pyrenaica* have leaves entire, but have the mouth of perianth spinulose-denticulate, although in the large size and delicate texture they agree well with typical *P. pyrenaicum*. But I am now of opinion that *P. pyrenaicum*, if not regarded as a distinct species, is a remarkable variety of *P. interruptum*.

In my notes on *P. interruptum* (l. c.) I only mention *Chiloscyphus polyanthus* as likely to be confused with it. I should, however, now state that the small variety of *Plagiochila asplenioides* is more frequently mistaken for it, though the absence of stipules and the almost constant presence of some denticulate leaves help to separate the two species.

The specimens of *Pedinophyllum* in the Manchester Museum fall into three groups:—

(1) P. INTERRUPTUM Gottsche & Rabenhorst . . . . Hep. Eur. nos. 36, 48, 109, 136, & 316; Massal. Hep. It. Ven. no. 78 as *Plagiochila interrupta* forma *robusta*; Carr. & Pears. Hep. Brit. no. 86 (some of the young stems have bidentate leaves); Schiffn. Hep. Eur. nos. 238–40; Austin, Hep. Bor. Am. no. 6 as *Plagiochila macrostoma* Sull.; *Leptoscyphus interruptus* ex herb. Lindberg; near the Strid, Bolton Woods, Carrington; as *Jungermannia subapicalis viticuliformis* Baumannshohle, ex herb. Hampe; Millers Dale, Chee Dale, Derbyshire, *G. A. Holt*; Windermere, *Carrington*, 1859; Bolton Woods, *Ingham*, Aug. 1900.

(2) P. PYRENAICUM (Spruce). Schiffn. Hep. Eur. no. 241 as *P. interruptum* var. *pyrenaicum*, Pyrenees, *Dr. Douin*; Shady rocks, Benbulben, Co. Sligo, May 1871; Glenade, Co. Leitrim, July 1913, *J. Hunter*; *J. polymorpha* Carrington, Malham, July 10th, 1857, "Seems a good species" Gottsche in letter Nov. 1861 (some of the leaves are entire and others bidentate, intermediate form).

(3) The following specimens in the collection, under the name of *P. interruptum*, are to be referred to other species:—

Plagiochila macrostoma Herb. Austin. "I find no stipules, but in general habit it is near the Ohio plant" Austin; Lindberg rightly referred *P. macrostoma* Sull. to *P. interrupta*, but this plant is quite different. Ravensdale, Derbyshire, *G. A. Holt*, May 1883; this is a small form of *Aplozia riparia*, with perianths, specimen evidently transposed.

P. interrupta, Canada, *Macoun*, Herb. Austin; *P. interrupta*, Ptarmigan, Scotland, C. J. Wild, Aug. 1878; *P. interrupta*, ex Herb. Lindberg: these three belong to *Plagiochila*, not to *Pedinophyllum*; Carrington has written on the packet of the last "*Adelanthus?*"

P. interrupta, on naked earth, Whitbarrow, *G. Stabler*, Sept. 1872; this is a form of *P. asplenioides*, as Carrington notes.

P. interrupta, Malham, *Carrington*, June 1872; this is *P. asplenioides*.

P. Spruceana Tayl. MS. Musci Pyrenaici, 6, 1848: a small form of *P. asplenioides*, with lower leaves entire, upper denticulate.

P. interrupta, Ardingley Rocks, Sussex, "Mitten's *J. trichomanoides*, G. Davies, on loam, *P. pyrenaica* Spruce, var. of *P. interrupta*" = (*P. asplenioides*).

A NEW CEREUS FROM THE WEST INDIES.

By Ove Paulsen.

In working out the *Cactaceæ* of the formerly Danish islands St. Croix, St. Thomas, and St. Jan in the West Indies, I have had to deal with fairly good plant-material preserved in alcohol. A key and list will be published later.

The following description is of a species which I believe to be new. American botanists are collecting material for a comprehensive treatment of the *Cactaceæ*, and it will be useful to publish any novelties, in order that they may be included in the final treatment:

Cereus venditus, sp. nov. (Ser. Triangulares K. Sch.).

Planta parva repens radicans ramis articulatis articulis triangularibus lateribus modice concavis angulis paullo sinuatis. Articuli 3–7 cm. longi eorum latera 6–9 mm. lata; areolæ 4–5 mm. distantes brevi-tomentosæ, aculeis radialibus ca. 10 centralibus 1–2, omnibus subæqualibus rigide setaceis ca. 3 mm. longis. Flores et fructus absunt.

In insula tunc Danica St. Jan leg. Eug. Warming, Jan. 30, 1892.

Copenhagen, June 26, 1918.

BIBLIOGRAPHICAL NOTES.

LXXIII. Maund's "The Botanist" (1836–1842?).

The recent acquisition by the Department of Botany of a copy of the first number of *The Botanist* in the original wrapper, which gives information as to its publication and scheme not easily accessible, led me to examine the work somewhat closely with results which, if not of the first importance, are, I think, not altogether without interest. As is usual in such cases, one thing led to another, and the investigation proved somewhat tedious to myself, as I fear the following account of the results may appear to my readers, in which case I will anticipate criticism by offering my apologies in advance.

I. The Dates.

The first point of interest in connection with the work concerns the date of publication, which has been variously stated: thus, Pritzel has "1839 sqq. v. vols."; Dr. Jackson's *Guide*, "1839, 8 vols." (doubtless a mere misprint); the Catalogues of the Libraries of the British and Natural History Museums and the *Dictionary of National Biography*, 1837–46; the Catalogue of the Kew Library, 1838–40; that of the Linnean Society, 1838–42; the *Index of English Printed Books*, 1837–42. In face of such discrepancies, it may be well to ascertain, at least approximately, the accurate dates; the volumes themselves supply no help, as no title-page is dated.

With regard to the date at which *The Botanist* began, the prospectus on the wrapper of the first number makes it clear that this is correctly stated by none of the authorities cited. The front page bears the date January 1, 1837, but on the back page is the following statement, from which it would appear that the magazine had been announced for an earlier date than that at which it actually appeared:

"To have deferred the publication of the *Botanist* would have occasioned much disappointment, and to have commenced issuing it, monthly, before the beginning of the year, would have produced an irregularity either in the size of the volumes, or the periods of their completion, which could never afterwards be obviated; the following mode of publication will therefore be adopted.

"In the undermentioned months	will be published	the numbers of the following dates:
September, 1836.		January, 1837.
November, 1836.		February, 1837.
January, 1837.		March, 1837.
March, 1837.		April, 1837.
May, 1837.		May, 1837.

And afterwards the *Botanist* will be published regularly on the first day of every month."

That the first number appeared about the date indicated is evident from the fact that it is noticed in Loudon's *Gardener's Magazine* for November 1836 (p. 598). The promise of regular issue seems to have been carried out for the first four volumes, so far as the numbers were concerned, though the volumes themselves were at times delayed in order to include the *Supplement* (as to which later), at others "in consequence of the disagreement existing between the journeymen bookbinders of London and their employers"—"strikes" apparently had not then received that name; it also occasionally happened, as we learn from the cover of no. 30, that "some portion of a number" was "unavoidably delayed at a time too late to admit of the circumstance being noticed on the wrapper." For much of the above information I am indebted to the copy of the *Botanist* at Kew in which almost all the wrappers have been preserved, those of the two last numbers, however, are missing, nor have I been able to find them —nor indeed any wrappers—elsewhere.

The general regularity of issue is confirmed by the references to the *Botanist* in the "Floricultural and Botanical Notices" which formed a useful feature of the *Gardener's Magazine* and are often of great assistance in fixing dates of periodicals. Loudon was a good bibliographer, and in these notices the month of issue is frequently given; the approximate dates of the numbers of Loddiges' *Botanical*

Cabinet, Knowles and Westcott's *Floral Cabinet*, Sweet's *British Flower-Garden*, and other magazines can be ascertained.

The fifth volume seems to have proceeded with regularity for the first half of 1841, except that two plates of the January number (tt. 201, 203) are assigned to "Feb." (Gard. Mag., March 1841, 168); tt. 217–219 are cited in the June Gard. Mag. and hence appeared not later than May; tt. 223 and 231 are specified respectively as "June" and "Aug." (tom. cit. 337, 562). The wrapper of the September number, however, contains an announcement that the "indisposition of parties" concerned prevented its completion in time for publication on the first of the month, and on the October number these circumstances are said to be still in operation. As has already been said, the November and December wrappers are not at Kew, nor have I been able to see them: judging from Maund's habit of taking his subscribers into his confidence, these would almost certainly have explained the reasons (which I have been unable to ascertain) for the discontinuance of the *Botanist* and may have given some indication of the dates at which these numbers were issued.

That the November number appeared in 1841 may be inferred from the reference to "last year (1840)" under t. 242; the inclusion of the *Botanist* in the Gard. Mag. list for August, 1842, shows that the November (and perhaps the December) number had at that time come to hand, as, although they are not quoted for any plant, it was not Loudon's custom to enter at the head of his "Floricultural and Botanical Notices" magazines which he had not actually received: moreover, the *Botanist* does not appear in later lists. That the December number was not issued in 1841 is evident from the reference under t. 248 to "flowers produced in the spring of 1842": it may indeed be suggested that the reference to "1842" instead of to "last year" may indicate a later date.

The outcome of these investigations seems to indicate that the date for the termination of the *Botanist* given in the British Museum Library Catalogue and transferred thence to other works is as inaccurate as that given for its beginning. The date 1846, I am informed, was adopted solely from the fact that the last part was delivered under the Copyright Act on May 9 of that year, the earlier parts having apparently been delivered as they appeared. It seems more likely that this delay resulted from some accident than that there should have been an interval of something like four years between the last and penultimate parts, especially as Maund, a man of energy and business capacity, continued to carry on his other periodical, the *Botanic Garden*, until 1851. Under all circumstances it seems that the date given in the *Index of English Printed Books* (1842) may be accepted as correct; the others cited at the beginning of this paper are manifestly inaccurate in both particulars.

II. The Magazine.

So much for the dates: I proceed now to give some account of the Magazine itself, here again gleaning much from the wrappers of the Kew copy. A MS. note at the head of the wrapper of No. 1 runs: "*The Florists' Magazine* (complete in 16 numbers) has been circulated: *The Botanist* substituted for it." This is signed with initials, somewhat difficult to decipher, the last being "S.": should the two preceding be "F. W." as is not unlikely, we might conclude that they were those of Frederick W. Smith, the author (and perhaps the illustrator, for none of the plates are signed) of the *Florists' Magazine.* The first number of this was issued in July 1835, and forms the subject of a laudatory notice in the *Gardener's Magazine* for August of that year (p. 425). It was to be issued monthly, each number containing 4 plates with 8 pages of letterpress, and costing 4*s.*; it was "devoted to the newest and most beautiful varieties of florists' flowers," and is of purely horticultural interest. The Kew copy is in quarto size as originally issued, and is a very handsome book; it includes the first volume and the two parts which were all that appeared of the second; from the latter we learn that the work came to a "premature end, not having met with sufficient patronage to cover its expenses." The whole work was subsequently issued in smaller size as one volume, dated 1836—"vol. i." having been removed from the title-page: in this the pagination is sometimes omitted. The Index includes the two parts of vol. ii., the paging of which is given as if continuous with that of the first volume.

The appearance in September 1836 of the first number of *The Botanist* synchronized with the penultimate issue of the Magazine* for which it was to be a "substitute." Whether Maund was directly or indirectly responsible for the abrupt termination (with the next (16th) number) of the *Florists' Magazine*—either by arrangement with F. W. Smith or through the latter's fear of competition—must be matter of conjecture.

The Botanist appeared in two editions—one (that usually met with) in quarto in half-crown numbers, the other, smaller in size, at eighteen-pence: each contained four plates with descriptive letterpress. With the first issue of the larger edition appeared the first instalment (4 pp.) of a "Dictionary of English and Latin Terms," written by Henslow for the work. It was proposed to continue this monthly until completion and to issue it also with the small edition, but the latter scheme was abandoned almost immediately on the score of expense, and the *Dictionary* itself was never completed in this form; it was however issued as a volume, under the title *A Dictionary of Botanic Terms*, in 1850, and went through several editions. With the second volume of *The Botanist* was issued as a supplement the first portion of a *Guide*, similar in shape, well printed and with numerous illustrations, for which Henslow was doubtless also responsible. This was continued at intervals, extending to 55 leaves (not pages) numbered at the foot: it is headed "Explanation of the Woodcuts illustrative of Natural and Artificial Divisions." It does not seem that this, which is uniform in size with the Magazine and is well printed, with numerous outline illustrations, was ever completed or reissued: it is sometimes bound separately as in the British Museum and Linnean Society's libraries. Both this and the parts of the *Dictionary* were at first attached to the numbers of the *Botanist*, but were subsequently detached, though issued with it. A further supplement, comprehensive in its nature, was projected by Maund in the shape of "a Table which shall exhibit Science at sight": this is announced on the wrapper of no. 23, but never appeared. Besides the foregoing there was issued at the end of each year a *Supplement* (so named) containing two plates (thus bringing the number in each volume up to 50) with descriptions, as well as index and titlepage. The *Supplement* for 1837 (tt. 49, 50) was not published until May 1838, in consequence of delay arising in connection with the ornamental steel-plate title-page which, as well as the title-page proper, accompanied each volume.

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* See *Gardener's Magazine*, Oct. 1863, p. 539, where "completes" should read "begins."

III. The Conductor.

Of the early life of Benjamin Maund the "conductor" and proprietor of these magazines, nothing seems to be known. The obituary notice in the *Proceedings of the Linnean Society* (1863–4, xxxii.), from which the account in Dict. Nat. Biogr. (xxxvii. 91) is largely derived, gives the date of his birth as 1790, but has nothing further to say about him until "he carried on the combined business of a chemist, bookseller, printer, and publisher at Bromsgrove in Worcestershire." Although styled (D. N. B. *l. c.*) a "botanical writer," he had small claims to such a description, though two short notes in the *Phytologist* (i. 15; 1844) indicate that he was interested in the plants of his neighbourhood; he also served (1835–42) on the botanical committee of the Worcestershire Natural History Society. He is not mentioned in Edwin Lees's *Botany of Worcestershire* (1867) nor in Amphlett and Rea's work with the same title (1909) in which neither of the notes above mentioned is referred to; but his name occurs twice in the (anonymous) botanical appendix contributed by Edwin Lees to Hastings's *Illustrations of the Natural History of Worcestershire* (1834).

In 1825 Maund began to publish *The Botanic Garden*, which he carried on with success for a quarter of a century, and which may form the subject of a separate note. Its favourable reception induced him to project the serial now under consideration, which, while resembling the Botanic Garden in *format*, should differ from it in important particulars, and would indeed appeal to a somewhat more scientific class of readers. The programme as set forth on the wrapper of the first number is sufficiently ambitious, but the anticipations raised were on the whole justified, though it is not easy to see its "first importance to persons going abroad, as it will enable the traveller to refer any unknown plant to its natural order." The plan and execution of the work show that Maund was fully competent to select as fellow-workers men who possessed the scientific knowledge which he himself lacked; the letterpress throughout is of a high order and far more comprehensive and informing than that of any of its contemporaries. *The Botanic Garden* had shown Maund's ability to supply cultural and general information in an acceptable way, and this he continued to do in *The Botanist*.

He was evidently a man of some literary ability; the notices to correspondents which appear on the wrapper of *The Botanist* are bright and sometimes amusing. These show a due appreciation of the two periodicals under his control—his preface to vol. i. of the *Botanist* presents a similar view—and indicate that he himself spared no pains to ensure success: "every process connected with *The Botanist* and *The Botanic Garden* are (*sic*) under the guidance of one individual and it is this that gives them the 'nicety of minutiæ' which [a correspondent] is pleased to praise." Maund occasionally exalts his work at the expense of (unnamed) contemporaries: "we never shall give an extra-sized plate and count it as two . . . . tawdry pictures are not our aim; the plates are finished pictures by the best artists." More than once, evidently in reply to criticisms, he points out that the plates in the small edition, published at eighteenpence, cannot be expected to be as good as those in the larger; it would seem that the former were only partly coloured, and that many ladies liked to finish the colouring for themselves. The small-paper issue was indeed criticized by Noel Humphreys in the article already cited: "some of the plates, from an injudicious economy, are arbitrarily cut into the required square, without much regard to beauty of design" (Gard. Mag. 1838, 176). Maund's enthusiasm for his undertakings was further shown by the pains he was at to increase their usefulness by supplements issued apart from the text: this he did for both his periodicals.

Before proceeding to an examination of *The Botanist*, it may be as well to complete what remains to be said about its "conductor," as Maund styled himself. In 1827 he became a Fellow of the Linnean Society: ten years later his name appears as joint editor on the title-page of the first volume of *The Naturalist*, but the text contains no information as to the nature of his connection with it nor does it include anything from his pen. "Having realized by his honourable industry a moderate competence," he retired from business about 1853, living first at Folkestone and later at Sandown in the Isle of Wight, where he was accompanied by his daughters, who had taken part in illustrating his works. Here he died on the 21st of April, 1863, and was buried at Brading.

IV. The Contributors.

Although Henslow's name alone is associated with that of Maund on the title-pages of the volumes, he was by no means the only nor indeed the most important contributor. The Introduction to the work may probably be assigned to him, but the "eminent Botanist of the Metropolis," who, as announced in the prospectus, aided "the Conductor in the undertaking," was, as we learn from the *Gardener's Magazine* for February, 1839 (p. 91), Dr. Robert Dickson (1804–75), by whom "the botanical descriptions during the progress of the first volume and part of the second were, it is understood, prepared." In this he was succeeded by Bentham, at that time Secretary to the Horticultural Society, whose initials first appear in connection with t. 82 (Aug. 1838), appended to a long account of the tribe *Spermacoceæ*, to which the plant figured (*Crusea rubra*) belongs. This is the first of a number of disquisitions on classification which raised the text of *The Botanist* to a level unattained by any other popular magazine, and were continued at frequent intervals until the conclusion of the work. Dickson still remained a contributor: his initials are appended tot. 148 (June, 1840). The descriptions signed by Henslow are not numerous, and occur chiefly in the first volume, but occasionally up to the end: to vol. i. he also contributed figures of *Gardoquia multiflora* (6), *Cactus speciosus* var. (12), and *Leontice Chrysogonum* (50); the figure and description of *Acacia Riceana* (135), here first established, are also by him. Other contributors of descriptions were Robert Graham (106, 201, 227, 238) and Frederick Westcott (218 and many in vol. v.). On the wrapper of no. 31 is a full prospectus, subsequently repeated, in which the names of Henslow, Dickson, Bentham, and Graham are mentioned as helping in the work.

In the Bentham correspondence at Kew are letters from Maund (1838–41) from which may be gathered the history of Bentham's connection with *The Botanist*. On May 8, 1838, Maund wrote inviting Bentham's coöperation, which had formed the subject of conversations of both with Dickson, and stating that, "for the description of each plant, whether compiled from published authorities or original," he had been accustomed to pay a guinea. Bentham apparently accepted these terms, and on June 10 Maund sent him a long letter, enclosing drawings and specimens: in this Dickson is referred to as "a very zealous coadjutor" whose "zeal of late has overpowered his physical strength." As a postscript he adds an indication of his wishes; this may be quoted as an evidence of Maund's intelligent interest in the work, to which reference has already been made:—"To render the descriptions &c. interesting to the general reader, I shall be happy to see occasional digressions introduced—particularly when any interesting physiological peculiarity can be dwelt on. Peculiarities, habit, culture, &c. are objects of great interest to the majority of persons. The complaint made against the old standard works was their want of interest to all but the professional botanist, of whom it may be said there are a few. As far as possible I like to see the pages filled, which I doubt not you will approve—a volume of half, quarter, and whole blank pages has a meagre effect when bound. Dr. Dickson very kindly has indulged in the elegancies of literature when science was exhausted, and this has many admirers, for I need not inform you that the majority of purchasers understand it much better than legitimate science." In January of the following year Maund sent Bentham a cheque for eighteen guineas for as many descriptions, of which he gives a list.

The last of the letters, the Bromsgrove postmark of which is 14 March, 1841, shows that Bentham's application for payment for work done had not been attended to, and that he had written again in a manner which Maund resented—"I do not venture to treat of your note in detail," he says, "as I may express myself more strongly than would be pleasing to reflect on."

V. The Artists.

Of the 250 plates which the work contained, more than a hundred were contributed by Mrs. Withers, who for a long period held a conspicuous place among the illustrators of floral magazines. She was "Flower Painter in Ordinary to Queen Adelaide" and was already well known as an artist in 1831, in which year Loudon (Gard. Mag. vii. 95) speaks highly of her ability "to draw flowers botanically," an art in which she was then giving lessons. Later he speaks (*op. cit.* x. 452) of her "high talents and great industry," and especially of the artistic merits of a "selection of Heartseases" which were in 1834 on view at the rooms of the Horticultural Society: "an eminent artist happened to call while they were before us, who declared that he had never seen any work of the kind so beautifully executed." Besides plates in the *Pomological Magazine* (1828–30) which she illustrated throughout, *Transactions of the Horticultural Society*, etc., Mrs. Withers drew some of the plates for Bateman's *Orchidaceæ of Mexico.* We have in the Department of Botany three drawings from her pencil: a very beautiful life-size figure of a blue Columbine, "from Lord Darnley's wood, Cobham, Kent" (1847), and a reduced drawing of *Zamia pungens* and a cone in its natural size drawn in Kew Gardens in 1839; the latter is a very fine piece of work.

Most of Mrs. Withers's plates are in vols. ii. and iii., those in vol. i. are mostly by R. Mills, who contributed about 60 to the work: at the same time he took a chief part in illustrating Knowles and Westcott's *Floral Cabinet* (1837–40). Other artists were Miss Taylor (23), the Miss Maunds, of whom more will be said when the *Botanical Cabinet* is considered, and Mrs. Edward Bury (8); individual plates bear unfamiliar names. Writing in March, 1838, at which period Mrs. Withers was in the ascendant, "H. N. H." (=Henry Noel Humphreys (1819–79)—probably the "eminent artist" mentioned in the preceding paragraph) says of *The Botanist*: "The work is very beautifully got up: the plates are well engraved on steel and very carefully coloured: indeed, perhaps more so than any work of its class except the *Floral Cabinet*"—the latter he mentions as "the only botanical periodical, upon this scale, which has taken advantage of the superiority of lithography for its plates" (Gard. Mag. 1838, 174–5).

VI. New Species, etc.

It may be worth while to give a list with dates of the few new species published in *The Botanist*, with notes on one or two other names which have suggested themselves while going through the volumes.

61. *Pimelea lanata* Henslow. March 1838. = *sericea* R. Br.
85. *Candollea Cunninghamii* Benth. Sept. 1838. Bentham's name nowhere appears, but it is attributed to him by Maund in his MS. list (see p. 241) and he accepts the responsibility in Fl. Austral. i. 39.
101. *Heliconia bicolor* Benth. Jan. 1839.
106. *Chorozema Dicksonii* Graham. Feb. 1839.

[119. *Caiophora lateritia* Benth. May 1839. The identity of this with *Loasa lateritia* Hook. is not indicated in Ind. Kew.]

135. *Acacia Riceana* Hensl. Sept. 1839.

[169. *Mimulus puniceus* Benth. May 1840. This name (= *Diplacus puniceus* Don) is cited in Ind. Kew. from Steudel, Nomencl. ii. 150 (1841).]

179. *Acacia dentifera* Benth. Aug. 1840. F. Mueller (Second Census of Australian Plants) erroneously dates this 1839.

181. *Aquilegia fragrans* Benth. Aug. 1840.

[184. *Pharbitis Learii* Benth. Sept. 1840. This antedates Lindley, Bot. Reg. t. 56 (1841), which is cited for the name in Ind. Kew.]

192. *Solanum vestitum* Benth. Oct. 1840. Ind. Kew. incorrectly gives the date as 1839.

[201. *Obeliscaria Drummondii* Graham. Feb. 1841. Cited in Ind. Kew. as of Maund.]

218. *Malva odorata* Westcott. June 1841. (= *Malvastrum capense* var. *fragrans* E. G. Baker.)

I must not conclude without expressing my thanks to Mr. S. A. Skan, of the Kew Herbarium, who has on this as on other occasions, notably in connection with our *Biographical Index*, rendered me much help.

JAMES BRITTEN.

WORTHINGTON GEORGE SMITH.

(1835–1917.)

WORTHINGTON GEORGE SMITH, who died at Dunstable from heart failure on Oct. 17 of last year, was born in North London on March 23, 1835. In his early years he was a "drawing student" of Greek and Roman sculpture at the British Museum, and subsequently studied for the profession of architecture. In 1858, he abandoned the pursuit of architecture in favour of book-illustration by wood-engraving and lithography; for many years he drew and engraved architectural subjects for the *Builder*. The study of ancient sculpture and ornament led him to pay close attention to plant form and later to botany: he had early begun the study of the larger fungi as a mental exercise. After receiving several money prizes for architectural designs, he was, in 1865, awarded the Banksian Gold Medal by the Royal Horticultural Society for coloured drawings of plants.

Before this time, however, he had become a member of the Society of Amateur Botanists, which had been founded in 1862, and to which reference has been made at various times in these pages in connection with biographical notices of those of its members who eventually became well known in the botanical world—Mordecai Cubitt Cooke (1825–1914), its president; William Williamson Newbould (1819–86); Henry Trimen (1843–96); with others of humbler rank, such as Alfred Grugeon (1826–1913) and some still living, such as Sir W.

T. Thiselton-Dyer and the Editor of this Journal. In the meetings and Saturday afternoon excursions of the Society, Smith took a prominent part: his first published papers—on *Euphorbia amygdaloides* and "On some Dioicious Plants" (Journ. Bot. 1864, 196, 229) were read at its meetings; I first met him about this time at an excursion in the neighbourhood of Finchley, at the period when North London, New Cross, and Clapham Common still offered botanical attractions. The friendship then established was never broken: we corresponded frequently, not only on botanical but on archæological and political matters—his letters were often amusing and his criticisms, botanical and other, incisive.

Smith's earliest botanical illustrations appeared in *The Wild Flowers of Great Britain*, by Robert Hogg, which was issued in numbers, each containing four plates with letterpress, between 1861 and 1880, and may form the subject of a separate bibliographical note. Begun by Charlotte Gower, the work, to the great gain of the subscribers, was taken up in 1864 and carried on to the end by Smith, who drew and lithographed the plates after t. 144. In 1867 he published, under the title *Mushrooms and Toadstools*, two large sheets of coloured drawings, with accompanying text: the latter was subsequently reissued as a small volume.

From this date onwards Smith was fully employed in botanical and horticultural literary work, both as author and illustrator. In 1868 he became a Fellow of the Linnean Society; in the following year he became associated with *The Gardeners' Chronicle*, for which he was for a long period the principal artist, and in which some of his best work appeared. In the same year he took up the illustration, in colour-lithography, of *The Floral Magazine*; this he continued until 1876.

In 1869 Smith placed before the Woolhope Club, Hereford (for some account of which see Journ. Bot. 1871, 307), his *Clavis Agaricinorum*—"an analytical Key to the British Agaricini, with characters of the genera and subgenera." This was Smith's first important contribution to mycological literature; it was printed in the Transactions of the Club and in this Journal for 1870. It summarized the results of many years' work, both in the field and in the library; the outlines on the accompanying plates were in every case drawn from nature. Dr. Henry Graves Bull, an enthusiastic mycologist, was then a prominent member of the Club, in connection with which (in 1867) he instituted the now popular "fungus foray"; he had become acquainted with Smith under somewhat amusing circumstances, as narrated by the latter in the notice of Bull contributed to this Journal for 1886 (p. 63)—a good example of Smith's lighter style, of which his notes on C. E. Broome (1899, 398) furnish another instance. In connection with the forays Smith published in *The Graphic* for 1873–5 three very clever and amusing full-page drawings, containing in a decorative setting of humorous incidents portraits of the more notable of those who took part in them. In later years he designed the *menu* for the dinner which was held in connection with the forays: no one who is not acquainted with these *jeux d'esprit* can form any accurate notion of Smith's ability and versatility. In 1874 the Woolhope Club presented him with a box of silver plate in recognition of his services in promoting the study and illustration of the higher fungi: in the same year he was elected a member of the Scientific Committee of the Royal Horticultural Society, which in the year following presented him with the Knightian Gold Medal for his researches into the life-history of the potato fungus. On this subject he published numerous papers: in 1891, at the request of the Irish Land Commissioners, he prepared a large wall-diagram of the disease for schools and farm-houses, for which Mr. Carruthers wrote the accompanying letterpress. In 1871 was published the first number of *Mycological Illustrations*, to which Smith contributed most of the figures and descriptions: this was produced in conjunction with and at the expense of W. Wilson Saunders (1809–79), but ceased with the second number (1872).

Between 1874 and 1883 Smith had published in *The Gardeners' Chronicle* a series of papers on the diseases of plants. Addresses on this subject were delivered by him at the Natural History Museum at the request of the Institute of Agriculture, and these formed the basis of a volume entitled *Diseases of Field and Garden Crops*, published by Macmillan & Co. He discovered in north-east London a "palæolithic floor," of which the Anthropological Institute published in 1883 an illustrated account from his pen: for some time his attention was concentrated upon the work of primeval man; his investigations into this were continued when he went to Dunstable (heart trouble having necessitated his leaving London), where he discovered a second "floor" which was duly described. Smith continued his researches and found two other "floors" on high ground in Beds and Herts, a large number of implements and flakes capable of replacement being found at both places; but of these no particulars have been published. In 1894 he summarized the results of his investigations into the prehistoric period in *Man, the Primeval Savage*, which contained a large number of new illustrations of skulls and stone implements; in the Victoria County History for Beds (1903) he published an account of early man in that county. In this year he was elected President of the British Mycological Society.

Before he left London, the Department of Botany acquired the large collection of drawings of fungi which Smith had made during the previous twenty-five years, as well as a series of coloured figures of British Orchids, mostly made during 1862–5 and thus examples of his early work, and numerous figures in pen-and-ink of pollen grains. To these at later date were added a collection, amounting to some hundreds, of the original drawings subsequently reduced for reproduction in the *Gardeners' Chronicle*, *Floral Magazine*, and elsewhere, including a number of abnormalities; these are admirable examples of the strength and firmness of his touch; his early architectural training was doubtless responsible for a certain hardness in outline which characterized much of his work. The drawings of fungi, much reduced, furnished the illustrations which Smith supplied for John Stevenson's *British Fungi* (1886). Many of these are reproduced in colour in the admirable and unique series of life-size water-colour drawings of the *Basidiomycetes*, now exhibited in the Botanical Gallery, of which Smith published an interesting account in this Journal for 1892 (p. 37): more than 2,000 species are figured, on 96 sheets of double elephant paper: the work occupied Smith for nine years, and has been occasionally supplemented by additions.

In 1844 the coloured models made by James Sowerby (1757–1822) during the preparation of his work on *English Fungi* were purchased for the Museum. In course of time these had become dirty and damaged, and Smith was engaged to repaint them: an account of the models from his pen, with supplementary notes by Mr. Carruthers, then Keeper of the Department, at whose request the work was undertaken, will be found in Journ. Bot. 1888, pp. 231, 268. In 1903 a *Guide* to these models was published as one of the Catalogues of the Natural History Museum: this is much more than its title might suggest, as Smith really made it a popular handbook to the better known of our larger fungi: the figures are from Stevenson's book. The drawings for Sowerby's *English Fungi* were presented to the Department in 1876, and Smith published a detailed account of them in this Journal for 1905. In 1891 Smith's *Supplement* to Berkeley's *Outlines of British Fungology*, published thirty years before, was issued by Messrs. Lovell Reeve & Co.

When preparing the exhibited series of coloured drawings to which reference has been made, Smith drew up manuscript descriptions of all the species, accompanied by line drawings illustrating the characters of each genus. These were acquired by the Department of Botany in 1905; they formed the basis of a *Synopsis of the British Basidiomycetes*—styled, not quite accurately, "a descriptive catalogue of the drawings and specimens in the Department of Botany,"—which was published by the Museum in 1908: it is a volume of 531 pages and is Smith's largest work, summing up as it does the knowledge acquired by him during the preceding sixty years. Of this work two reviews will be found in Journ. Bot. 1909, 32–38, to which, in the Departmental copy, Smith has added MS. notes in reply to criticisms. For the Museum he also prepared a large coloured drawing illustrating *Field and Cultivated Mushrooms* and fungi often mistaken for them: this was published in smaller size with a descriptive "Guide" in 1910; in the same year two large sheets of coloured drawings, respectively representing edible and poisonous fungi, were prepared by him for exhibition in the Department.

Besides separate works and papers already referred to, Smith was a frequent contributor to various magazines, among which may be mentioned *Nature*, *Grevillea*, *The Monthly Microscopical Journal*, *The Popular Science Review*, and *The Scottish Naturalist*. In this Journal, especially in its earlier days, he published numerous notes and papers; in the second volume (1864), besides the *Euphorbia* papers already mentioned, he gave a detailed account of poisoning by *Agaricus fertilis*, by which he himself and his family were seriously affected. His communications, which included original articles and reviews, chiefly related to fungi; of the latter an amusing criticism of De Lisle Hay's *Text-book of British Fungi* (Journ. Bot. 1887,

120) may be mentioned. Occasionally, however, his notes related to flowering plants—*e. g.* those on "Bedfordshire Plants" (Journ. Bot. 1885, 220) and on "The Box in Britain" (Journ. Bot. 1901, 73), the latter containing antiquarian as well as botanical matter.

A few words may be added as to Smith's other activities. As soon as he had settled in Dunstable, he threw himself with enthusiasm into the political life of the town, in the archæological and antiquarian aspects of which he also took much interest. He was a keen and incisive combatant in the Radical interest: I have now before me a Christmas card issued in 1900 "in pleasant commemoration of six valiantly fought consecutive battles, all happily crowned with victory to the Liberal Party of South Bedfordshire over the combined forces of Tories, Unionists, Primrose Leaguers, and Mercenaries." This card is elaborately symbolic, as the letter which accompanied it explains; a copy was sent to nearly every Liberal elector in South Beds. Smith was very clever at this kind of thing, in which his architectural training (traces of which could be detected in his plant drawings) stood him in good stead: "We had a grand fight here," he says, "at last election: I produced large cartoons for public exhibition: these and my head, 25 feet across, were shown by lantern on a sheet in the open air." In 1903 he received the freedom of the borough—no freeman had been elected since the foundation of the borough by Henry I.—"in appreciation of the eminent services he had rendered to his country in connection with his profession and his munificent gifts to the Corporation of Dunstable." In the following year he wrote and illustrated a little book on *Dunstable and its Surroundings* for the Homeland Association. In 1897 he was appointed Secretary for Bedfordshire by the Society of Antiquaries.

For some of the facts contained in this notice I am indebted to a printed circular issued shortly after Smith's death by his eldest son, Mr. Arthur E. Smith. It is remarkable that no reference to one who has for so many years held a prominent position in the English botanical and horticultural world should appear in *Who's Who*, in which so many obscure and insignificant folk find place.

James Britten.

CERASTIUM SEMIDECANDRUM L.

By C. E. Salmon, F.L.S.

The normal form of *Cerastium semidecandrum* one meets with on dry heaths, open downs, wall-tops, and elsewhere in Britain, is a plant of more or less small stature (2–8 cm. high), with stem-leaves obtusely pointed, flowers in a fairly compact cyme at the summit of the stem, and with the capsule when ripe being almost straight and protruding but slightly from the calyx.

Botanizing in 1914 between Bramley and Catteshall in Surrey I came across, in a cultivated field, a great quantity of a *Cerastium* (varying but little in the bulk) showing none of the above characteristics, and I was puzzled. Here was a plant 12–16 cm. high, the stem-leaves broad and rounded at the apex (recalling those of *C. glomeratum*), and the flowers were in a loose cyme the branches of which, when in fruit, occupied sometimes a third or more the total height of the plant. The ripe capsules were distinctly curved and about twice as long as the calyx.

The bract and other features pointed to *C. semidecandrum*; upon turning to books of reference etc., it seemed that my plant agreed with the *C. pellucidum* Chaub. in Saint-Amans Fl. Agenaise, p. 181, t. 4. f. 2 (1821), which may be placed as a variety of the former species.

De Candolle (Prod. i. 416, 1824) allows *C. pellucidum* specific rank, practically Latinizes Chaubard's description, strangely alters that author's "pétales moins longs que le calice" to "petalis calyce longioribus," and concludes "An var. *C. semidecandri*?"

A possible arrangement of the British forms of *C. semidecandrum* might be as follows:—

CERASTIUM SEMIDECANDRUM L. Sp. Pl. 438 (1753).
    C. varians Coss. & Germ. var. *pellucidum* C. & G. Fl. env. Par. ed. 1, 38, Atlas fl. Par. v. f. 7–9 (1845), non Chaub.
    C. semidecandrum L. α. *genuinum* Rouy & Fouc. Fl. Fr. iii. 220 (1896).
    Exsicc. Dickson, Hort. Sicc. fasc. 8, n. 11! G. Don, Herb. Brit. n. 59!
    Icones. R. Syn. ed. 3, t. 15. f. 1; Vaill. Bot. Paris. t. 30. f. 2; E. Bot. t. 1630, ed. 3, 220; Curt. Fl. Lond. fasc. 2, t. 33; ed. 2. fasc. 3, t. 101; Fl. Danica, vii. t. 1212; Rchb. Fl. Germ. v. t. 228. f. 4968.
  Var. *glandulosum* Koch, Syn. ed. 2, 133 (1843).
  Var. *congestum* Gren. Monog. Cerast. 29 (1841) (see Journ. Bot. 1913, 17).
  Var. *pellucidum* Celak. in Sitzungsber. böhm. Ges. Wiss. p. 388 (1882) (nomen); Rouy & Fouc. Fl. Fr. iii. 220 (1896); *C. pellucidum* Chaub. (*loc. cit.*).

EDWARD WALTER HUNNYBUN (1848–1918)

AND 'THE CAMBRIDGE BRITISH FLORA.'

ALTHOUGH the late Mr. Hunnybun cannot be placed among those who have added greatly to our knowledge of the British Flora in the field, it is to his work that we are indirectly indebted for what promises to be the most important history of its constituents. As is generally known, *The Cambridge British Flora* originated with the series of drawings which he had for many years been preparing. Selections of these had been submitted from time to time to British botanists and were exhibited at the Linnean Society: the high opinion generally expressed as to their value led to their acquisition by the

University of Cambridge, and it was there decided to make them the basis of a work which should take rank as the standard authority on British plants. In this action the precedent of *English Botany* was followed; it will be remembered that that work, although its value is mainly due to J. E. Smith, was initiated by James Sowerby, its illustrator, whose name stands alone on the titlepage of the first three volumes; an explanation by Smith of his connection with the book, which was popularly known as "Sowerby's English Botany" is given in his preface to the fourth volume, which bears both names.

In our review of the first issued volume of the *Flora* (Journ. Bot. 1914, 134) we paid tribute, not unmixed with criticism, to Hunnybun's work, and there is no need to repeat what is thus readily accessible. It may, however, be noted that the fact that his figures were always drawn from actual specimens was not altogether an unmixed advantage: Hunnybun had not the comprehensive knowledge which enabled him to produce a drawing which gave a view of the species as a whole, and which characterizes the plates of Curtis's *Flora Londinensis*: "I only draw what I see," he was wont to say, and, so far as the specimens actually before him were concerned, his representations were always correct. He was indefatigable in his endeavours to obtain material for his drawings, often taking long bicycle journeys from Huntingdon in the early morning, in order to collect specimens, before his professional work began. He carried on a large correspondence with British botanists in connection with the desiderata which they were always glad to supply; from time to time he issued a circular containing a list of these, with practical instructions as to the best method of sending: from the last of these, issued early this year, a paragraph may be cited:—

"I am not willing to send out this list without a few words of apology for doing so at a time of so great national stress. I am in my seventieth year and not very robust, so that I personally cannot undertake any war-work either as a substitute or otherwise. I am anxious to complete an undertaking which for the last 20 years and upwards has occupied all my leisure and I rely on the sympathy of my correspondents to enable me to do so. Throughout the war I have continued to receive much help from field botanists, but as the time they have spent in getting me plants has been taken from their hours of necessary recreation such assistance has not in any way hindered war-work. What remains for me to do is chiefly to substitute good for poor drawings and to add to good but incomplete drawings."

This was followed by a brief intimation that specimens should not be forwarded, as the artist's state of health would not permit him to attend to them: this indication of serious illness was shortly followed by the announcement of his death, which took place at Ventnor, Isle of Wight, on the 3rd of last month.

For the following particulars of Hunnybun's life we are indebted to *The Huntingdonshire Post*. He was educated at Norwich under Dr. Jessopp, was articled to his father, Mr. Martin Hunnybun, who practised as a solicitor at Huntingdon. In 1872 he passed the final law examination, was placed second in the honours list and awarded the Clement's Inn Prize, a much coveted distinction. He then joined his father in the practice, and on the latter's death in 1883 carried it on with his brother, Mr. Gerald Hunnybun, continuing to do so until 1913, when ill-health compelled him to retire. For nearly forty years he was Clerk to the Huntingdon Board of Guardians, an office which he filled in such a way as to win the esteem and affection of the members of that body. After his retirement he took up his residence at Ventnor, where he died on July 3.

Our readers will learn with interest that it is hoped to issue the third volume (the second in appearance) of *The Cambridge British Flora*—a work with which Hunnybun's name will always be associated and which may be regarded as his monument—in the spring of next year.

SHORT NOTES.

Philonotis cæspitosa var. adpressa Dismier in Britain. Mr. W. Ingham detected two tufts of this moss in a large gathering of *P. cæspitosa* from a wet bog on London Clay near Burridge Heath, Great Bedwyn, South Wiltshire (v.c. 8) which I recently sent for the Moss Exchange Club. The var. grew sparingly in three places in the marsh and I noticed several ♂ flowers; Mr. Ingham wrote:—"Dismier is our greatest authority on *Philonotis* and has produced a monograph on the genus. He says that *P. fontana*, *seriata*, *tomentella*, and *cæspitosa* all produce similar varieties as *adpressa*, *laxa*, *orthophylla*, etc.; his description of var. *adpressa* of *P. cæspitosa* is as follows:—Stems of 5 cm., little coherent, scarcely radiculose, slender, simple, without innovations; leaves dimorphous, some like the type, others distant, erect, strongly applied against the stem, widely oval, and shortly acuminate. *P. cæspitosa* varies like the other species, and I have var. *laxa*, var. *elongata* and var. *orthophylla*; your var. *adpressa* is the first record for the British Isles. Dismier named var. *adpressa* in 1908; it has long very slender stems without tomentum; when dry the stems are very slender." It is rather curious that in Britain the East Wiltshire village of Great Bedwyn should at the present time almost monopolize the two *Philonotis* vars.—*P. cæspitosa* var. *adpressa* and *P. calcarea* var. *laxa*; the latter I have, however, traced into Berkshire, where it grows by the Kennet and Avon Canal at Hungerford.—Cecil P. Hurst.

Carex elongata L. var. umbrosa Kneucker in Seubert-Klein Ex.-fl. Badens, 55 (1891). This wood form of *Carex elongata* was sent me in 1916 by Mr. Horwood from Reydon Wood, E. Suffolk. It differs from the type in being slender, diffuse and supple, by the small number of flowers in the axils and the longer glumes; its whole aspect is more like that of *C. remota*. North Essex is the only record for E. Anglia; it was found by E. G. Varenne in Mark's Hall Wood, near Coggeshall, and recorded by Thomas Bentall in Phyt. ii. 886 (1847). It was named by Babington (Manual ed. 3: 358, 1851) β. *Gebhardi*=*C. Gebhardii* Willd. in Schk. Riedgr. ed. 2, 22 (1806)=var. *simplicior* Anderss. Cyp. Scand. 60 (1849). But this is a boreal and alpine form of the plant, which so far as I know has not been found in this country.—Arthur Bennett.

ELATINE HEXANDRA IN SOUTH HANTS. In June, when Canon Bullock-Webster and I were exploring Sowley Pond, near Lymington, for aquatic plants, we came across *Elatine hexandra* occurring in small quantity, on the flat sandy shore in company with *Littorella*, *Centunculus*, *Eleocharis acicularis*, and such-like small plants. It is not recorded for the vice-county in Townsend's *Flora of Hampshire*. —JAMES GROVES.

REVIEWS.

Tidal Lands: A Study of Shore Problems. By A. E. CAREY, M.I.C.E., and F. W. OLIVER, F.R.S. London: Blackie & Son. Demy 8vo, pp. xiv, 284, 29 plates. Price 12*s.* 6*d.* net.

IN this book the preservation and reclamation of land subjected to the influences of tidal action are for the first time comprehensively dealt with in the light of recent observation and experimental work. The writers speak with authority, each having for many years devoted himself to foreshore aspects of his subject. The volume is thus certain to prove of great service to those responsible for the proper maintenance and improvement of our coastline: not only are the causes of past failures indicated, but improved methods are suggested.

The outstanding feature of interest is the setting forth of the manner in which vegetation can be treated as a factor in engineering. The first chapters, however, deal with the non-biological aspects alone—of "Tidal Data," "The Tidal Compartment of a River," and "The Foreshore" respectively. These chapters are comprehensive but, unfortunately, not well written; they are not easy to read and the meaning is sometimes obscure: the following sentence, not an isolated example, will not stand analysis:—"The questions of the velocity of the ebb current and the period of time of the tidal flow are, within limits, local in character, the great aim being to secure by regulated control such conditions that the shipping normally frequenting the river shall be navigated without let or hindrance, predetermined depths of waterway being automatically maintained" (p. 16). Moreover, since the book is intended for landowners, technical terms (*e. g.* grout, berm, apron, &c., &c.) might with advantage have been introduced with an explanation.

The botanical aspect begins with a good chapter on "The Function of Vegetation," which contains all the information necessary to enable the lay reader to understand fully the later chapters. The sand dune is then described, its vegetation and the methods by which stabilisation of mobile dune by plants has been achieved being fully dealt with. These chapters, which are well written and clearly subdivided, show us a problem approaching complete solution, indicating how man by skilful use of vegetation can master the combined forces of wind and sand. Opportunity is seized to emphasize the economic value of *Psamma* for paper-making; such natural resources should be more fully exploited. The shingle beach is next described, and the great value of certain plants for stabilisation is again shown. Of these *Suæda fruticosa* is the most useful; the results of the biological study of this species are of far-reaching economic importance. The term "anarhizophyte" is coined for plants which, like *Suæda*, are able to root and continue growth in the new terrain (*e.g.* shingle) which invades and overlies the original habitat (*e.g.* salt-marsh). Though the forces of wave-action are more violent than those of wind, and shingle is less suitable for plant growth than sand, yet by the use of proper methods it seems reasonable to expect that this combination also will have to submit completely to the control of man.

The chapters which follow—on "Tidal Land Reclamation" and "Erosion and Accretion"—are again from the non-biological point of view. Information is supplied in great detail concerning the planning, building, and cost of sea-walls and groynes. A study of this portion of the book by those who have to deal with foreshore problems should save many thousands of pounds and prevent many failures, which in the past have so often occurred solely because those responsible were ignorant of the known results of experiment elsewhere. The refusal to expend adequate national funds to meet the requirements of each case is well stated to be a disgrace to the nation, especially when there is so much wasted expenditure. It is clearly indicated that each of the forces operative on the foreshore requires to be understood; their particular action and resultant in each locality need expert study before works intended to withstand them are entered upon. This part is well illustrated, as is the book throughout, but the text is again often badly written: *e.g.*, "The broad standard rule for the level of the sluice outfall may be stated as a level such that the drainage can get away freely from about half-ebb to half-flood" (p. 132). A "level" cannot be a "rule": the meaning might have been made clear in fewer words "The . . . . rule is for the level . . . . to be such that the drainage . . . ." It is a pity that so excellent a book should be marred by indifference to clear expression.

Mud flats and their vegetation are then described, and the way in which plants raise the level of the flats to such a height that they can be reclaimed (they apparently can never reclaim themselves) is clearly elucidated. The special case of *Spartina* is fully discussed, with a warning of the danger that it may, unless prevented, cause the silting-up of harbour channels. It is shown how the details of the development of the successive stages on mud flats often depend upon the historical factor, *i.e.* the introduction of a species at a critical stage. As the exact functions of each species are more clearly understood, owing to detailed ecological studies such as are carried out by Mr. Carey's school at Blakeney, it becomes increasingly possible to control and hasten the development of an area by the deliberate introduction of various plants at desired spots or periods. The economic value of such ecological studies is ably demonstrated, and foreshore owners may study vegetation to considerable profit. A chapter on "Miscellanea" (Cliffs, River-banks, &c.) completes the study of tidal areas in general. An interesting account of Blakeney Point shows how the existing structure and plant-covering is related to the physical and ecological factors which produced it, and serves as an illustration of the statements made earlier in the book.

The remainder of the volume deals with problems of administration and control. The great evils attending the usual British method of letting everybody "gae his ain gait" are well shown—that a private individual should in 1896 be able to wreck a permanent foreshore by dredging sand and gravel seems little short of a scandal: ignorance of the probable effects is no excuse in a nation that affects to rule the waves. It is of course difficult to obtain co-operative action in this country, but if the advice given by these experts were followed, a more satisfactory era should dawn for the foreshore.

This excellent and stimulating book, of which print, illustrations, and index are alike good, should be in the hands of every intelligent foreshore worker.

A. J. W.

L'Evolution des Plantes par NOEL BERNARD, Professeur à la Faculté des sciences de Poitiers. Préface de J. COSTANTIN. 8vo, pp. xxxii, 314: 29 figg. Paris: Félix Alcan. Price 4 fr. 55 c.

DE mortuis . . . . . the old adage saves us not a word in our notice of the paper-covered volume before us. With regret we learn from the preface that the author died in the first month of 1911 at the early age of thirty-six; so that this work has been given to the public only after a lapse of over seven years since its completion.

It is a concise and altogether fascinating account of vegetable evolution, comprising three principal sections. The first of these, "Lois générales de l'Evolution," affords us a fair example of the peculiar possibilities of the French language in the direction of clearness, simplicity, and conciseness—the eternal legacy to French prose of the author of *Lettres Provinciales*. For here, within the compass of 160 clearly-printed pages, we find an admirable general account of the vast subjects of Individual Evolution and Sexuality; the ideas of "Species," "Varieties," and other systematic units; Heredity; Hybridization; Variation. The standpoint throughout is historical, although this, we venture to suggest, seems not sufficiently emphasized. This first part should be as invaluable to the elementary student—particularly the prospective examinee—as it is pleasing to the past-master of botanical science.

The second part deals with concrete examples, being a very general account, comprised within a hundred pages, of "Les Plantes supérieures," from Bryophyta upwards. The third part, which occupies the remaining 45 pages of the text, is devoted to "Quelques Hypothèses." The brevity of this part inspires a warm regret that the author was not spared to develop and display, for the benefit of prosperity, some of his favourite notions, such as those upon symbiosis in relation to evolution, the natural history of orchids, heteroblastic development, and so forth.

L'Evolution des Plantes is as readable as it is cheap at its price of barely four shillings; its least original attribute is its title.

H. F. WERNHAM.

BOOK-NOTES, NEWS, ETC.

AT the meeting of the Linnean Society on June 20, Sir N. Yermoloff gave an exhibition of lantern-slides representing a series of intermediate forms of the Diatom genera *Navicula* and *Cymbella*. The slides showed a series of closely connected forms, so gradually and continuously passing into one another that it would seem possible to group them into one synthetic genealogical evolutionary line of descent. A fossil Diatom from the freshwater deposit of Monmouth, in the American State of Maine, lying approximately at the latitude of the Great Canadian Lakes—this deposit probably dating from before the Glacial periods,—may be considered as the primordial ancestral form from which the whole series was derived during the post-glacial ages. This parental form is *Navicula monmouthiana* forma *genuina*. The grouping together into lines of genealogical descent closely connected intermediate forms of Diatoms, which, in the enormously crowded systematics of *Diatomaceæ*, may otherwise stand rather far apart, has been hinted at by Cleve. The present attempt at what may be called synthetic integration of intermediate forms has been undertaken in further pursuance of Cleve's idea. The work mainly consisted in finding, between firmly-defined species, the connecting links. The exhibited forms came from two European and two American localities. They are all freshwater Some are firmly established species, others intermediate forms, which may be given so-called hyphenated nominations, stating the initial species from which they seem to start and the final species to which they seem to tend. The slides were shown in the following sequence, corresponding to the line of their evolutionary descent:—*Navicula monmouthiana* forma *genuina*, American fossil; *N. monmouthiana, with first slight variation* towards the *Stodderi* form, American fossil; *N. monmouthiana-Stodderi*, an American living hyphenated form; *Cymbella Stodderi*, American living; *C. Stodderi-angustata*, American living; *C. æqualis*, European living; *C. angustata*, European living; *Encyonema gracilis*, American fossil; *E. scotica*, European living; *Cymbella delicatula*, European living; also living in America; *C. gracilis-Cesatii*, an American living—a hyphenated form; *C. Cesatii*, European living; *C. microcephala*, European living. The detailed examination of the above evolutionary ladder suggests the hypothesis that the large, simple, and homogeneous ancestral form *Navicula monmouthiana* was a primordial species adapted to the more uniform conditions of life on the planet during the pre-glacial epochs, and that the *Cymbellæ* which subsequently evolved from it are smaller, more complex heterogeneous forms, gradually derived from *Navicula monmouthiana* under the influence of quite different and more varied conditions of life and climate, which established themselves on the earth after the Glacial epochs, at least under the latitudes between 40 and 60 degrees North. A similar trend of changes from larger and less varied forms to smaller heterogeneous ones has affected the whole of organic life after the glacial extensions towards the South. No wonder that the same trend has wrought similar changes also in Diatoms. Several authors admit that the *Cymbellæ* are degenerated *Naviculæ*. This seems plausible, only the term "degenerated" can hardly be used as we cannot know the direction of Evolution as a whole. The most we can say is, that the immediate result of evolutionary changes consists in a better adaptation, in the struggle for existence, to changed conditions of life.

At the same meeting, Mr. E. J. Collins read a communication on "Sex-segregation in the Bryophyta," of which the following is an abstract:—Three cultures of *Funaria hygrometrica* were made in Marchals' nutrient fluid as follows:—A. Protonemata grown from the antheridia of a male "flower"; B. Protonemata grown from the perigonial leaves of the same male "flower"; C. Spores from a ripened capsule. Submitted to the same cultural conditions, A and B produced a sward of plants with large discoid male "flowers" *only*, no sporogonia being produced at any time, C produced plants bearing male and female organs resulting in a dense crop of sporogonia. It appears possible that vegetative development from structures borne on male and female branches respectively may, if a sex-segregation has actually occurred somatically, lead to the production of distinct male and female plants. If such is the case, the purity of the gamete in monoicous forms is secured by a somatic segregation in haploid tissue. From other evidence it seems clear that the point at which segregation occurs is not necessarily fixed, but may be shifted backward in the life cycle until, occurring with sporogenesis, the dioicous habit of the gametophyte is established. In this way the dioicous condition might co-exist with the monoicous, or the monoicous condition might be accompanied by distinct male plants. Vegetative propagation from sex-segregated branches would also lead to the various sex-forms of any one species.

A STUDY of South African Perisporiales has been published by Miss Ethel M. Doidge in Trans. Roy. Soc. S. Africa, v. pt. 6 (1917); it is of special interest to mycologists, appearing, as it does, so soon after the publication of Steven's account of *Meliola* in Porto Rico: we have thus parallel studies of the group, more especially of the genus named, which should prove of great value. Miss Doidge explains her method of examining these fungi, which inhabit the surface of living leaves and, as partial parasites, do considerable damage, and render the leaves very unsightly. A large number of new species are described and illustrated, and there is a useful host index.—A. L. S.

THE number (vol. vii. no. 3) of the *Journal of Genetics* issued on June 28 contains an unusual proportion of papers of botanical interest. Among these are two relating to British plants—one, "On the Occurrence, Behaviour, and Origin of a Smooth-stemmed Form of *Digitalis purpurea*," by Edith A. Saunders; the other "On the Genetics of *Teucrium Scorodonia crispum*." by M. C. Rayner, D.Sc. The conclusions as to the *Digitalis* show that it "occurs under two distinct forms, the one, commonly accepted as the type, with the stem grey and densely pubescent throughout, and the leaves very hairy, designated *pubescens*; the other, not apparently hitherto distinguished, with the stem green, polished and smooth from the base to the flowering region where it becomes pubescent, and leaves less hairy, designated *nudicaulis*." The two forms, which usually occur together, are similar in every respect except as regards surface character, and are equally fertile; both forms, when of pure parentage, breed true; it is suggested that *nudicaulis* may be the earlier form and *pubescens* the derivative. The form or variety of *Teucrium Scorodonia* "is of rather more compact habit than the species, the leaves are broader and blunter and the leaf-margins are characteristically crisped or crested," as shown in the plate which accompanies the paper. The plant has been cultivated for many years; the original was a wild plant found in Devonshire at least fifty years ago. Self-sown seedlings are of the normal type, showing no traces of the crested character. The number also contains "A Further Note on the Genetics of *Fragaria*," by C. W. Richardson, and "The History of *Primula malacoides* under Cultivation," by Arthur W. Hill, with two plates.

The *Kew Bulletin* issued in June contains a monograph of the British species, eleven in number, of *Melanconium*, by Mr. W. B. Grove, and an account of the species of *Hippia*, by Mr. Hutchinson, which includes six species, one of which—*H. trilobata*—is new. Mr. W. Dallimore writes on "Wood-Preservation" and there is a short notice of Maurice de Vilmorin, of the firm of Vilmorin-Adriens, who died at Les Barres (Loiret) on April 21, at the age of 69.

Mr. F. N. Williams has prepared a new catalogue of British Plants, which will be published after the end of the War. It will form a systematic index to his *Prodromus Floræ Britannicæ*, of which the manuscript approaches completion. The sequence of genera will closely follow the arrangement in Engler and Prantl's *Die Natürlichen Pflanzenfamilien*, as exemplified in Mr. L. Garland's *Flora of Jersey* (1903) and in certain North American Floras,—with a few modifications suggested by Rouy and Foucaud's *Fl. de France* (1893–1913), Caruel's *Epitome Floræ Europæ*, and Dahl's new edition of Blytt's *Norges Flora*. As in the British Museum List, neither varieties nor census-numbers will be included; but full references will be given for the names of orders, families, tribes, genera, and species—checked and verified. The starting-point for names of all grades will be Tournefort's *Institutiones Rei Herbariæ* (1700), where such names have been taken up by Linnæus or his immediate followers, mainly as regards genera.

The correspondence in *The New Phytologist* on "The Reconstruction of Elementary Botanical Teaching" to which we have already referred (p. 160) is continued in the issues for May and June. It is remarkable for a liveliness and freedom of expression which does not often occur in such discussions: in the present instalment Prof. Bower writes: "The signatories [of the "encyclical" which originated the correspondence] appear to advocate Botanical Bolshevism. They propose that in order to secure improvement, 'comparative morphology should be reduced to a subordinate position.' I confess such a dictum from scientific men takes my breath away. I hope it is only a slip of the pen, and that they really mean 'co-ordinate' and not 'subordinate.' But five cultivated minds have committed themselves to the latter word. In order to secure their own Utopia they propose to 'subordinate' something which they admit is good in itself. That is the spirit that has ruined Russia, and endangered the future of civilisation. Are the signatories prepared to follow a like course?"

JOSEPH ANDREWS AND HIS HERBARIUM.

I. INTRODUCTORY.

BY G. S. BOULGER, F.L.S., AND JAMES BRITTEN, F.L.S.

A COLLECTION of British plants in the Botanical Department of the British Museum which was originally known as the Hemsted herbarium proved, on examination, to be in the main that formed at Sudbury by the apothecary Joseph Andrews (a friend of Dale) between the years 1710 and 1757, merely re-arranged with Linnean names added and the original labelling retained.

But little is known as to Andrews. He is first mentioned in contemporary literature in the Dillenian Synopsis (1724); and although plants received from him were preserved in Dale's herbarium, the reference (Journ. Bot. 1883, 196) of one of Dale's records to some date earlier than 1695 applies probably to James Newton, not to Andrews: Andrews's own specimen of the plant in question (*Trigonella purpurascens* Lam.) is labelled "Between Sudbury and Lavenham, May 21, 1727."

In Henry Field's *Memoirs of the Botanic Garden at Chelsea* (ed. Semple (1878), p. 22) it is stated under the date 1707 that "In consequence of Mr. Doody's death, Messrs. Wyche, Andrews, and Petiver were appointed to inspect the Garden." The earliest dated specimens in Andrews's herbarium are those of 1711; these include some from Peckham Fields, Putney Heath, and Islington, together with others from near Cambridge, Newmarket, Maldon, and Bulmur; this last locality in North Essex being very near Sudbury. Putney Heath, it may be remembered, was one of the places regularly visited in the "herborizings" of the Apothecaries Society.

In Sloane MS. 3340 (f. 255) is a copy by Petiver of his letter of June 28, 1716, to Dr. John Thorpe, of Rochester, which contains an account of a botanical excursion with James Sherard during the previous week into Norfolk and Suffolk; in the course of this he writes: "At Sudbury we met with Mr. Andrews an Apothecary, a very obliging and curious Botanist, who carried us to y^{e} Alsine Rutæ fol. & tenuifolia [*Veronica triphyllos*] ye Medica cornuta seu Fœnum Burgundianum [*Medicago falcata*] and Frog Orchis [*Habenaria viridis*] then in flower: he also obliged us with several dry specimens, amongst y^{m} a new Plantago aq. [*Alisma ranunculoides*] with very long grassy leaves w^{ch} I think I have seen in y^{e} canals in Holland.

Andrews mentions several species as having been shown or given to him by "Mr. John Field, Apothecary at the Bell in Newgate Street." The collection contains specimens from Halstead, Essex, dated 1715, and from Tilbury in 1716, and this latter year is the first in which there is a mention of plants received from Dale. There are, however, but few specimens dated before 1721, when the earliest mention of Sudbury itself occurs. In that year and in 1722 Andrews visited Cambridge: in 1722 he and Dale were at Mersea

Island together; and Dale visited him at Sudbury in 1725, 1732, 1733, 1734 and 1738 (See the account of Dale in Journ. Bot. 1883). William Sherard, writing to Richardson on July 24, 1722, says "My brother . . . talks of going . . . to Mr. Dale and Mr. Andrews, at Sudbury, in Suffolk; so to Newmarket and Cambridge; and it is probable, when there, may make a trip into the Fens" (Richardson Corresp. 184). As Andrews visited the Isle of Ely in that year, they may have gone together.

All the earlier specimens in the Herbarium are, as might be presumed, labelled in accordance with the second (1696) edition of Ray's *Synopsis*; but Andrews's own copy of the Dillenian edition was in the possession of the late W. A. Clarke. From one entry in this work it may, perhaps, be inferred that at the time of writing it (1724) Dillenius was not personally acquainted with Andrews. On p. 253, under "Caryophyllata montana purpurea" (*Geum rivale* L.) . . . . ., Dillenius has, "Found in a Bog, about a Mile from Sudbury in Essex, by Mr. Allen Apothecary there"; whilst in Andrews's own copy of the book "Essex" is corrected to "Suffolk" and "Allen" to "Andrews." This copy of the Dillenian *Synopsis* has on its title the autograph "Joseph Andrews, Sudbury, Suffolk"; and the few marginalia that it contains consist of English names for fungi, cross-references, and a few slight corrections, but include references to Gerard "Ger. emac.," "R. Hist. vol. i.," "Miller's Gard. Dict. vol. 2 under Lichen," "Boerhaave's Hist. Plant."—probably the *Index* which was published in 1710—and Derham's *Physico-theology* which belongs to 1713: this last, under *Cicuta*, is to the effect that that plant "cures the Farcis in Horses."

Two begging letters among the Sloane MSS., signed J. Andrews—one, in Latin, dated 1722, the other in English, but referring to previous Latin correspondence and dated 1731,—are both from London, and, though in handwriting not unlike the herbarium tickets, are not, we think, by Andrews of Sudbury; nor is there any satisfactory evidence to connect him certainly with the associate of Petiver and Wyche in the inspection of the Chelsea Garden in 1707 already mentioned.

From all the biographical evidence, including that of the tickets in the herbarium, it seems probable that Andrews was a native of Sudbury: he was at any rate, as we have seen, established there as an apothecary in 1716. He was very probably apprenticed to Mr. John Field, Apothecary of the Bell in Newgate Street, from whom he mentions having received specimens, and who is described by Henry Field (*op. cit.* 101) in connection with the affairs of the Chelsea Garden as "an active and intelligent member of the Society" of Apothecaries. At all events Field gave him plants, showed him localities and botanized with him at Hampstead and elsewhere near London. Having, as we have seen, made the acquaintance of Dale and Sherard, Andrews was elected a Fellow of the Royal Society in 1727. He seems seldom to have gone far from Sudbury—Braintree, Ipswich, Newmarket, Ely, Thetford and Norwich being apparently the limit of his divagations. The latest date on the herbarium tickets is July 28, 1762.

The Herbarium at one time belonged to the Rev. Charles Sutton (1756–1846) who sent specimens from it to Smith, in whose Herbarium they—*e.g.*, two specimens of *Mentha*—may be found, with labels in Andrews's hand: on these Smith has noted: "Given me by the Rev. C. Sutton from an old herbarium collected in Essex." The Herbarium later became the property of the Rev. John Hemsted, whose father—also John—was Vicar of Haverhill, Suffolk, and whose grandfather (b. 1660) was of Sudbury. Born at Linton, Cambridgeshire, June 11, 1746, the third John Hemsted graduated B.A. at Cambridge 1810 and proceeded M.A. in 1814: he subsequently became rector of St. John's, Bedford, where he died in February 1824.

Although he did not publish anything, Hemsted was a considerable botanist. A correspondent of J. E. Smith and James Sowerby, he contributed several plants to *English Botany*, some of which form the subjects of three letters to Sowerby, now in the Department of Botany. With one of these Hemsted sent three plants which he thought had "some pretensions to scarcity—*Gnaphalium dioicum*, *Herniaria glabra*, and *Agrostis Spica-Venti*." The first of these is mentioned as from "Hempsted" on Sowerby's drawing for E. Bot. t. 747, though the figure was not prepared from his specimen: the *Herniaria* was the specimen employed for t. 1171: on the drawing is a note by Smith to Sowerby: "is this found wild at Newmarket? If you are not certain, please to write to Mr. Hemsted as it is very important": the answer was in the affirmative, as in the text to the plate Smith says "wild specimen near Newmarket" (see F. A. Garry, *Notes on Drawings for E. Botany*, pp. 103, 153). In the same letter Hemsted speaks of *Crepis biennis*, and refers to the opinion of Relhan, with whom he was on terms of intimacy, concerning it (see Garry, *op. cit.* 112). In his letter of Aug. 10, 1796, Hemsted criticizes the colouring of Sowerby's plates, which he says "has sadly fallen off: only give yourself the trouble of comparing the *Campanula latifolia* with the *Trachelium* published in the early part of your work, but I forbear adding any more as it is not my intention to give blame but to convince": in a postscript he says that his remarks apply "principally to the purples." The third letter (Mar. 10, 1797) relates to mosses sent by Hemsted.

In Turner and Dillwyn's *Botanists' Guide* (1805) Hemsted records (p. 564) *Senecio paludosus* L. from Lakenheath Fen, near Wangford; and *Salix rubra* Hudson from Icklingham. He added Linnean and English names to Andrews's Herbarium, arranged it according to the Linnean system, and drew up a MS. index of genera and one of species for each fascicle; but there are few plants of his collecting. A fascicle of Mints, now with the Herbarium, is labelled throughout in Hemsted's hand; it seems to consist mainly of one of the sets which Sole distributed, and Sole's names are often quoted. It would appear that Hemsted was specially interested in *Mentha*; in a letter to Sowerby dated Sept. 19, 1799 (in the Department of Botany) Relhan says: "Mr. Hemsted came over to Cambridge this morning and brought me specimens of two Mints which he had not been able to ascertain."

A specimen of *Orobanche purpurea* Jacq. (*O. cærulea* Vill.) is labelled by Hemsted: "Found July 2, 1796, near Sherringham, Norfolk. Wm. Skrimshire scripsit"; one of *Odonthalia dentata* Lygnbye—"*Fucus dentatus* With. iii. 428; Gathered on the Shore at Leith by my Brother Fenwick:" the former is recorded on Skrimshire's authority in Bot. Guide 437 (1805).

William Skrimshire (1766–1830), of Wisbech, contributed papers to *Nicholson's Journal of Philosophy*, 1806–09 . . . and is mentioned by Sutton in Trans. Linn. Soc. iv. 184, where the finder's name is spelt "Scrimpshire"—the earlier relating to electricity, the later (xxi. 71, 182: 1808) to "the fecula of potatoes and some other British vegetables," which in the present economic conditions may possibly merit attention: the "other British vegetables" are *Æsculus Hippocastanum*, *Quercus Robur*, *Bryonia dioica* and *Arum maculatum*: in the following year he published in the same *Journal* (xxii. 70) an "Account of a British Vegetable Product that may be Substituted for Coffee": this was the seeds of *Iris Pseudacorus*, the preparation of which is elaborately described: he mentions that the "seed-pods" were at Wisbech called "Old Sows"—a name which is not given for the plant in the *Dictionary of English Plant-names*. To the *Transactions of the Entomological Society of London*, of which he was a Fellow, Skrimshire contributed (i. 315: 1812) a paper on "Rare Insects found during a Flood at Wisbech," with a list (Coleoptera): to the same volume the Rev. Thomas Skrimshire, LL.B., presumably a brother, also contributed. Another brother, Fenwick Skrimshire, M.D., already referred to, is mentioned by Smith (Fl. Britannica, i. 238: 1800) as having found *Campanula rapunculoides* "at Blair in Scotland."

Although but little is known about him, William Skrimshire was evidently well acquainted with British plants: this is evident from a letter to James Sowerby, to whom he had sent plants for *English Botany* (see tt. 379, 423, 463) which it may be worth while to transcribe:

"Wisbeach,
Septr. 14, 1795.

"Dear Sir,

"I take the earliest opportunity of correcting an error I have committed concerning the *Sium repens*:—as my friend Mr. Relhan informs me he is at length convinced that my specimens are nothing but the *nodiflora* starved. The *Stellaria* which accompanied my last letter I have sent a specimen of to Relhan, who says it is *graminea*.

"I have sent two or three plants with this letter and wish they may be of use. The *Riccia glauca* I have sent as it grows with us in water and on dry ground; having no recent specimens of the plant as it grows on the surface of the water, am obliged to send dried ones—they differ in no respects from the plants which grow on the ground, except in the long fibrous roots and their not being so disposed to affect a circular form. I find the plants floating on the surface of the water plentiful in a Ditch at Outwell near Wisbeach—

those on the ground are frequent at the mouth and by the sides of ponds at Wisbeach. The *Inula pulicaria* grows at Leverington, near Wisbeach. The *Salicornia herbacea* and *Statice reticulata* are both very common on the salt marshes below Wisbeach. The *Atriplex littoralis* is plentiful by the sides of ditches below Wisbeach, but I am afraid it is too far advanced to be of any service.

"The *Rubia tinctorum* is plentiful in hedges about Wisbeach where it grows very luxuriantly—it has not been an object of cultivation in this Neighbourhood for upwards of fifty years, and if you think it admissible, I will send you specimens. I am just this moment going to take Mr. Cockfield to see it growing: if I'm back before our mail sets off will inclose some of it. I think it has as good a claim to a place in your work as some other plants which are termed by the consent of Botanists, British.

I remain in haste,
Yours &c.,
Wm. Skrimshire, Junr."

(To be continued.)

NOTES ON FORFARSHIRE PLANTS.

By C. E. Salmon, F.L.S.

In July 1912 Mr. E. G. Baker joined me for a ten days' holiday in Forfarshire (v.c. 90), and the plants mentioned in the following notes were then met with. One day was spent near Forfar, where the old station for *Eriophorum alpinum* was explored, and another given to "Thrums" and its delightful surroundings.

The Rev. E. S. Marshall and Mr. Arthur Bennett have helped in the preparation of these few notes, and we had the advantage of meeting the late John Knox at Forfar and gained some valuable information from him. * denotes a supposed addition to the county.

Cochlearia alpina Wats. Head of Canlochen Glen.

Thlaspi alpestre L. The plant from the Canlochen rocks has usually (Watson, Compend. Cyb. Brit. 480, 1870) been placed under var. *sylvestre* (Jord.), but it differs much from the Winch Bridge, Teesdale, form which was verified by Boreau (Baker, N. Yorks. ed. 2, 256, 1889) as this variety.

The Forfar plant, which seems very scarce, as it was in Gardiner's day (Fl. Forfar. 9, 1848), is much more dwarf in habit; the leaves are more "leathery" and of a reddish-glaucous hue, the notch of the silicle is shallower and the style is longer.

The difficulty of matching our British plants with named Continental forms has been pointed out by White (Fl. Bristol, 158, 1912), and with this view I thoroughly agree. At the same time, it seems better to place provisionally the Forfar plant under *occitanicum* (Jord.) rather than *silvestre*, as suggested in Watson B. E. C. Report for 1897–8, p. 4.

Polygala oxyptera Reichb. By the roadside between Clova and Bradoonie.

Sagina subulata Presl. Some fine plants by the roadside below the Clova Inn; a few reached 10 cm. high, but had not the large capsules (4 mm.) of Rouy and Foucaud's var. *major*.

S. scotica Druce. In Glen Doll, between Craig Maid and Craig Rennet; marshes above the head of Canlochen Glen. References should be made to Dr. Moss's valuable account of this plant in Journ. Bot. 1914, 57 and to an interesting note by James Backhouse, jun., in Phytol. iii. 770 (1849), where he reports from Glass Mhiel (close to Canlochen) a puzzling *Sagina*. Is it possible that his "*saxatilis*" was *scotica*, and his "*nivalis*" perhaps *S. saginoides* var. *macrocarpa*?

Montia lamprosperma Cham. North-east end of Loch Wharral; source of Capel Burn, above Bradoonie.

Geranium lucidum L. Den of Kirriemuir.

Alchemilla pratensis Schmidt. By roadside S. of Balgavies Loch.

A. alpestris Schmidt. Frequent about Restenneth, Rescobie, and Balgavies.

A. minor Huds. var. *filicaulis* (Buser) Lindb. fil. In Glen Doll, between Craig Maid and Craig Rennet; at about 1200 ft. on slopes E. of Moulzie, near Bradoonie. This scarce plant was first found in Forfar by Mr. Marshall in 1888.

Saxifraga platypetala Sm. Glen Fee.

Hippuris vulgaris L. South of Kinordy House, Kirriemuir.

Callitriche hamulata Kuetz. Stream above Den of Kirriemuir.

Gnaphalium sylvaticum L. var. *nigrescens* Gren. Not far from the inn at Clova. Attention is called to this plant by its remarkably long flowering-bracts (particularly noticeable in the earlier stage of the inflorescence, when they not infrequently overtop the spike) and the shorter, much denser spikes of flowers, which have involucral scales of a rich brown; this colouring, however, is sometimes found in the lowland forms of *sylvaticum*. I have excellent examples of var. *nigrescens* from Glen Doll gathered by Mr. Burkill in 1896, and have seen it growing near Killin and near The Cairnwell in Perthside. Extreme states of this variety have been confused with the rare *G. norvegicum*—indeed, my Cairnwell plant was so named by two of our ablest British botanists. A synonym of var. *nigrescens* is apparently var. *minus* Godet, Fl. Jura, 370, 1853.

Taraxacum officinale Weber var. **maculatum* Jord. Abundant near marshy ground, south of Kinordy House, Kirriemuir.

Pyrola minor L. Fir wood near Restenneth Priory.

Veronica serpyllifolia L. var. *humifusa*. Craigs above Lochs Brandy and Wharral.

**Rhinanthus borealis* Druce. Glen Fee. Luxuriant examples reaching nine inches in height; stem unbranched.

R. minor Ehrh. An interesting form of this, with bright yellow flowers, grew in Glen Doll at about 2000 ft. elevation, having rather broad blunt leaves, long internodes, and simple stem: it deserves further study on the spot.

Melampyrum pratense L. "var. *montanum* Johnst." Glen Doll, near Craig Maid. This is the "smaller-flowered, more delicate, usually montane plant with entire bracts" which I mentioned in Journ. Bot. 1914, 140; it has, I believe, been mistaken (and recorded sometimes) for *M. sylvaticum*.

Plantago maritima L. East end of Rescobie Loch.

Rumex domesticus Hartm. Frequent about Rescobie and Balgavies Lochs and about Restenneth.

R. alpinus L. The leaves of this were seen, not far from cottages, north of Rescobie Loch.

Orchis incarnata L. Restenneth Moss. Agrees well with Mr. Marshall's description (Journ. Bot. 1912, 215) of the Somerset plant; the name has been confirmed by Mr. Rolfe.

Eriophorum latifolium Hoppe. Bogs behind the inn at Clova.

Carex dioica L. Restenneth Moss.

C. teretiuscula Good. Swamp near Restenneth Farm.

C. paniculata L. var. *pseudo-paradoxa* Asch. & Graebn. See Journ. Bot. 1916, 15.

C. canescens Lightf. var. *fallax* Kurtz. Slope of Glas Maol, above Canlochen Glen. This was pointed out to me on the spot by a Scotch botanist as "*helvola*," but Messrs. Bennett and Marshall agree that it is a form of *canescens*, which seems to come under Syme's "*alpicola*" now generally considered the same as var. *fallax* (see Journ. Bot. 1905, 115 & 1908, 372).—Var. *tenuis* O. F. Lang. East slope of Ferrowie, Clova, at about 2500 ft. Confirmed by Mr. Marshall, who notes "Just like my plants so called by Kükenthal."

C. aquatilis Wahl. I gathered a particularly neat and graceful form of this, 12–18 inches tall, on the west slope of Ferrowie, at about 2200 ft., which Mr. Marshall thinks "can hardly be pure *aquatilis*—too delicate. Probably a very pretty *C. aquatilis* × *Goodenowii*. It looks sterile." I cannot, however, see any signs of veining upon the perigynium.—Another *aquatilis* form, from the slope of Glas Maol above Canlochen Glen. with a decided hybrid appearance, Mr. Marshall suspects to be "a hybrid of *C. aquatilis* var. *sphagnophila*; very probably × *Goodenowii* (rather than × *rigida*)" (see Journ. Bot. 1911, 301).

C. glauca Scop. var. *stictocarpa* (Sm.). Glen Fee. Noticeable from its short ± ovate fruiting spikes, strongly dotted fruit, pointed glumes, and the long leafy bracts.

C. capillaris L. Glen Fee.

C. binervis Sm. var. *Sadleri* Linton. Seen in Glen Fee and also above Loch Wharral. From the latter station the Rev. E. F. Linton reported it in his interesting and clear account (Journ. Bot. 1898, 41) dealing with this striking variety and allied plants. It is usually found growing with *C. binervis*, but is readily distinguished at sight.

C. fulva Host. Bogs behind the inn at Clova.

C. flava L. In Glen Fee, at about 2000 ft. Growing at the same elevation and not far away there occurred a patch with fruits only (approximately) half as large as those of typical *flava*, otherwise it seemed decidedly that plant—var. *lepidocarpa*. Restenneth Moss.

C. filiformis L. Swamp near Restenneth Farm.

Poa nemoralis L. var. **coarctata* Gaud. Capel Mount, near Bradoonie; near Craig Maid, Glen Doll; in both stations at about 2000 ft. Mr. Pugsley suggested this name, which I believe is correct. The chief points mentioned by Gaudin (Fl. Helv. i. 241, 1828) are the stiff rigid erect stems, close spike-like non-nutant panicles, spikelets sub-3-flowered; the whole plant slightly glaucous.

Glyceria declinata Bréb. East end of Balgavies Loch.

Lycopodium annotinum L. Glen Fee.

L. alpinum L. "Race, *L. Issleri* Rouy." In Glen Doll, between Craig Maid and Craig Rennet. This is apparently the correct name for the plant we used to call var. *decipiens* Syme.

Isoetes lacustris L. Loch Wharral.

NOTES ON THE ALGÆ OF LEICESTERSHIRE.

By Florence Rich, M.A.

The last *Flora of Leicestershire* including the Cryptogams was issued by the Leicester Literary and Philosophical Society in 1886, and in 1913 steps began to be taken to bring out a new and enlarged edition. Owing to the War, publication has been indefinitely postponed, and it has therefore been thought well to bring out an interim report on some of the work done on the aquatic Algæ.

For the four years preceding 1886, Mr. F. Bates of Leicester collected samples of Algæ for the purpose of inclusion in the flora. He made his collection from a restricted area surrounding his own house at Narborough and from the western part of the Charnwood Forest district. He named 234 species and 17 varieties, but doubt attaches to the authenticity of some of his records. His collection of microscope slides is now in the possession of the Leicester Literary and Philosophical Society; when examined in 1913 many of the slides were found to be in an excellent state of preservation (especially those of Desmids and Spirogyras), though many had perished. (The specimens were mounted in an 8–10 per cent. solution of camphor in distilled water, ringed with white zinc cement.) Bates wrote an interesting account which was published in the *Flora*, and his list (in which, however, the Diatoms were entirely ignored) was subsequently slightly extended by Mr. F. T. Mott (see "Flora of Cropstone Reservoir," by T. A. Preston in Trans. Leicester Lit. Phil. Soc. 1895, 437). With the help of Mr. A. R. Horwood of the Leicester Museum and other friends, samples have now been obtained from each of the twelve districts into which for floristic purposes the county has been divided. It has thus been possible to extend the known range of some species and to add fresh ones to the list. The flora of an English county is, as a rule, exclusively of local interest, but in preparing it many points of more extended interest come out, sometimes confirming, sometimes contravening. former generalisations.

Leicestershire is, on the whole, a flat county, the highest ground occurring in the Charnwood Forest region, where there is a range of hills varying in height from 500 to 900 ft. This, our nearest approach to a "mountainous tract," consists of Trias marls and limestones with an outcrop of pre-Cambrian rocks. The algal flora of the Charnwood Hills affords evidence of the abundance of Desmids said to be characteristic of such tracts—*i. e.* mountains consisting of pre-Cambrian rocks (G. S. West, *British Freshwater Algæ*, p. 6). The genera *Arthrodesmus*, *Euastrum*, and *Micrasterias* are found exclusively in this district; *Pleurotænium* here and in the immediate vicinity; *Closterium* mainly here. West says "In mountainous areas the filamentous forms are chiefly representatives of the *Myxophyceæ* and *Conjugatæ*." *Mougeotia* is certainly commoner here than in other parts of the county; the *Myxophyceæ* are present though not markedly prevalent. It may here be noted that the genus *Vaucheria* is scarcely found in this region, though abundant in other parts of the county.

Geologically Leicestershire may be roughly divided into three parts—the Charnwood District, the district west of the R. Soar consisting of Red Marl (Trias), and the district east of the Soar consisting of Lias clays and limestones. Of these the Charnwood district is the richest in Algæ, and the Lias clays are the poorest.

Collections have been made at all seasons of the year, though most frequently in spring and summer. The two months in which the winter conditions of low temperature and prolonged darkness are most pronounced are, of course, December and January. The genera which have been observed in the samples gathered in these months and which may therefore be looked upon as the hardiest are:—*Œdogonium*, *Ulothrix*, *Microspora*, *Vaucheria*, *Mougeotia*, *Zygnema*, *Spirogyra*, *Cosmarium*, *Closterium*, *Conferva*, and *Oscillatoria*, together with certain Flagellates (*Trachelomonas volvocina*, species of *Euglena*) and cold-loving diatoms (e. g. *Meridion circulare* Ag., *Hantzschia amphioxys* (Ehr.) Grun.). On the other hand, some of the genera not yet found in December and January, though noticed in most of the other months of the year, are *Cladophora*, *Pediastrum*, and *Anabæna*. The decrease in amount of *Cladophora fracta* in winter has been noticed in other places (see "Biology and Ecology of the Algal Flora of Abbot's Pool, near Bristol" (Fritsch and Rich) in Proc. Bristol Nat. Soc. 4th Series, ii. pt. 2 (1909)). Samples have been obtained from large and small ponds, reservoirs, streams, rivers and canals, from the outflow of the furnace boilers at Coalville, and the hot water of the cooling reservoir at the Belgrave Sewage Pumping-station. *Cladophora* shows a marked preference for the well aërated waters, for out of 23 localities in the county in which it has been found, one was a swiftly-flowing stream in Grace Dieu Woods, one was a weir at Baggrave Hall, one was a rapid stream at Kirby Muxloe, five were ordinary little streams (Little Dalby, Thurnby, Ingarsby, Barkby, Quorn), six were rivers or canals, two were ditches, four were large pieces of water, and only three were small ponds (Glenfield, Medbourne, and Laughton).

The *Zygnemaceæ* are very well represented in Leicestershire, and a few special observations have been made on them. Species of *Mougeotia* are of common occurrence and are often present in considerable amount, though West in the *Handbook for Birmingham*, edited by

G. A. Auden, prepared for the meeting of the British Association, 1913, 466, says, in speaking of the Algæ of the Midlands (meaning the Birmingham district—which only overlaps the county of Leicester to a small extent), that they are uncommon. The only forms found in the reproductive state are:—*M. genuflexa* (Dillw.) Ag., Burley Pond (Rutland), August 3/15; Ditch, Narborough, November 4/15, *M. scalaris* Hass., Woodle Head (Rutland), May 29/15, and *M. viridis* (Kütz.) Wittr., High Sharpley, May 9/15, Blackbrook Reservoir, May 25/15, and Timberwood Hill, June 2/14.

Probably the commonest species of *Zygnema* is *Z. cruciatum* (Vauch.) Ag., but as zygospores have never once been found in the recent collections, identification is not to be relied upon. Amongst Bates's slides zygospores may be seen in *Z. Vaucherii* Ag. (Charnwood Heath, May 22/84), and in *Z. cruciatum* (Canal, near Blaby, July 30/83). Conjugation has been observed occurring at Sawley Bridge (May 24/13), and Saddington Reservoir (May 22/15).

Spirogyra is not only one of the commonest algæ met with, but it is also found fruiting very freely, and as many as twenty species have been identified. It has been found in every month of the year except October and December. The close of the summer phase observed by Fritsch and Rich (Ann. Bot. xxi. 423–436) and confirmed by them (Ann. Biol. lacustr. vi., 1913) and Delf (New Phytol., Feb., Mar., 1915) is well marked. The autumnal phase is, as has been observed, a short one, and there is a gap between this and the vernal phase. *Spirogyra* becomes common quite early in the year, appearances having been recorded for Jan. 3/15, Jan. 6/16 (two ponds), Jan. 16/16, Jan. 20/16 (2 ponds), and Jan. 30/16 (two pieces of water). Reproduction is observed to take place sexually most commonly in May, but this process begins irregularly in April and goes on to July. Conjugation does occur, however, in March, and zygospores have even been observed as early as February (Sileby 1913, Whissendine in Rutland 1916—but see *infra*). There is one record only for the presence of zygospores as late in the year as September, and that is in the case of *S. nitida* (Dillw.) Link (Gallows' Lane, Willesley, Sept. 4th, 1915). On the whole, the Leicestershire Spirogyras bear out the observations previously (Prelim. Observations on *Spirogyra*, loc. cit.) recorded—that sexual reproduction in this genus occurs almost exclusively in the vernal phase. The occurrence of quantities of *S. nitida* in the reproductive stage in September 1915 is worth noticing, for it is a form that nearly always reproduces in the early summer:—May /15 at Croft, at Swithland, and Ratcliffe on the Wreake; May /05 in Abbot's Pool, Bristol; June /02 at Kew. *S. varians* (Hass.) Kütz. keeps constantly to April and May for the formation of its zygospores; April /13 Lea Lane, April /15 Narborough, April /16 Atherstone, May /15 Measham, May /15 Woodle Head, no other dates whatever being recorded. *S. affinis*, which was previously found (Ann. Bot. xxi. 433) to have rather a long reproductive period, extending from April to July in Abbot's Pool, and from September to November in Telscombe Pond, was only found with zygospores late in May; Swithland, May 31/13, Woodle Head, May 29/15, Croft, May 29/16. *S. tenuissima* (Hass.) Kütz. was found reproducing on May 31/13 at Swithland, and on May 19/14 at Scraptoft. From a comparison of these dates with those previously noted, it would appear that in the latitude of the East Midlands reproduction in *Spirogyra* takes place just a little later than it does farther south. This looks as though temperature must be one of the most important factors in bringing it about, and this is further exemplified by the influence of the very warm January of 1916. In February of that year at least two Spirogyras were found with zygospores, viz. *S. Weberi* and *S. Grevilleana.* So early an appearance of conjugation is very unusual.

Sirogonium sticticum Kütz. is not a very common alga, but was found in quantities in three different parts of the county—Shakerstone Canal, May /13, conjugating; near Castle Donington, May /13, conjugating and forming zygospores; Sutton Wharf, June /15, zygospores. It was not observed in any of the other samples examined.

The Desmids collected by Bates were examined and described by John Roy of Aberdeen. He says (Fl. Leicestersh. 327): "The species are not nearly so numerous as might be expected considering the number of localities examined," but the localities to which he refers are, after all, fairly near one another. He would be still more astonished could he see the far smaller number now collected from an area many times as large. He remarks on the entire absence of the genera *Desmidium*, *Spondylosium* and *Xanthidium*—of these, *Spondylosium papillatum* has now been found (Colery Reservoir, June /14). The best-represented genera are *Cosmarium* and *Closterium. Cosmarium Botrytis* Menegh. is perhaps the commonest species. but *C. Meneghinii* Bréb. is also widely distributed. *Closterium moniliferum* Ehrenb. is frequently found, and this is true of *C. acerosum* (Schrank) Ehrenb. and of *C. venus* Kütz. The only three forms of which zygospores have been found are:—*Closterium rostratum* Ehrenb., July /14, *Cosmarium Botrytis* Menegh. var. *paxillosporum*, June /14 and *Arthrodesmus incus* (Bréb.) Hass., June /14. *Closterium moniliferum* Ehrenb. has been observed in all months of the year, but most commonly in May. *C. acerosum* (Schrank) Ehrenb. occurs from April to September, but again most commonly in May. Roy speaks of *Micrasterias denticulata*, *Tetmemorus lævis*, and *Penium curtum* as being "very numerous," but not a single specimen of either has been found in the recent collections. The genus *Staurastrum* is undoubtedly less well represented now (though it is still one of the three commonest genera). Species of *Euastrum* are certainly rarer. and the genera *Mesotænium*, *Cylindrocystis*, *Docidium*, *Gonatozygon*, and *Hyalotheca*, recorded by Bates, have not so far been found at all.

It seems evident, therefore, that Desmids are not so prevalent in the county as they were thirty years ago. What is the cause of this? Mr. Horwood (Crypt. Fl. Leicestersh. in Trans. Leicester Lit. Phil. Soc. xiii. 35, 1909) says: "In the region of Charnwood Forest . . . . . neighbouring collieries have wrought sad havoc by reason of the volumes of smoke, dust. steam, and injurious gases continually being belched forth from their chimney stacks," and it may be that the consequent increase in amount of dissolved salts in the water is slowly annihilating the Desmids (*cf.* West, *Algæ*, vol. i.).

In connection with the disappearance of some of the forms in Bates's list the case of *Batrachospermum* may be quoted. He found *B. moniliforme*, together with its var. *setigerum* Rabenh., and also *B. atrum* Harvey. Attempts have been made to collect from the same localities as Bates, but so far no trace of this alga has been found.

It may be well here to mention a few instances in which the former list has been extended. Bates found six species of *Vaucheria*; to these have been added *V. racemosa*, *V. uncinata*, and *V. hamata* (Vauch.) Lyngb. His Œdogoniums have been extended by the addition of *Œ. cryptoporum*, *Œ. grande*, and *Œ. sociale*: his Cosmariums by *C. holmiense* Lund. var. *integrum*, *C. humile* Gay., and *C. granatum* Bréb.

The foregoing notes are fragmentary in character, but they serve to indicate some of the points brought out in examining these collections.

I wish, in conclusion, to thank Professor F. E. Fritsch for his help and for the facilities afforded by him for consulting his algological library at the East London College.

NORTH SOMERSET MOSSES.

By Cecil P. Hurst.

My thanks are due to Messrs. H. N. Dixon, H. H. Knight, and J. A. Wheldon for kind notes and assistance received in compiling the following list which contains seven new vice-comital records, to which an asterisk is prefixed, and consists of mosses observed growing near Burnham-on-Sea in North Somerset (v.c. 6) during the winter 1916–1917:—

Campylopus brevipilus B. & S. On peat between Ashcott and Shapwick (*teste Dixon*); this species was also found near Shapwick by Mr. W. B. Waterfall, a record given in Mr. W. Watson's "The Mosses of Somerset" (*v.* Proc. Somerset Arch. and Nat. Hist. Soc. vol. lviii. 1912, part 11, pp. 114–164).

Fissidens incurvus Starke. Plentifully on a bank by a stream near Edithmead, where I also found a few plants in an orchard.

Grimmia maritima Turn. Significantly of its avoidance of lime, this species is unrecorded for the calcareous vice-county of North Somerset, while there is only one record for S. Somerset in "The Mosses of Somerset," above referred to—*G. orbicularis* Bruch. On walls between Burnham and Berrow.

**Tortula lævipila* var. *lævipilæformis* Limpr. Not uncommon on trees by watercourses near Burnham; Mr. Dixon writes:—"I should call the var. *lævipilæformis* a good variety, with the border distinct as well as the propagula numerous"—*T. ruraliformis* Dixon.

Abundant on the sandhills near Burnham and fruiting in various places—*T. papillosa* Wils.* In five or six localities near Burnham on trees by water with the penultimate. Mr. Dixon tells me he has frequently found these plants associated and considers that they prefer a larger amount of moisture than the normal form of *T. lævipila.*

Barbula Hornshuchiana Schultz. Burnham sandhills, fruiting rather freely near Berrow Church.—**B. convoluta* var. *sardoa* B. & S. On the churchyard wall at Berrow (*teste Knight*).

**Trichostomum mutabile* var. *littorale* Dixon. Plentifully near a large patch of bracken on the south side of Brean Down—*T. flavovirens* Bruch. Locally common on Burnham sandhills.

Encalypta streptocarpa Hedw. On walls near Sand's Hall, Wedmore.

Zygodon viridissimus R. Br. c.fr. in one or two localities near Edithmead.

Aulacomnion palustre Schwæg. Marshy ground between Shapwick and Ashcott.—*A. androgynum* Schwæg. Extremely abundant and ubiquitous on peat between Shapwick and Ashcott where Mr. Watson has found capsules, which are very rare in this plant.

Webera nutans Hedw. On peaty soil near Shapwick.

Bryum pendulum Schp. Sandhills near Berrow (*teste Knight*).—*B. pseudo-triquetrum* Schwæg. Sandhills near Burnham and also near Berrow, very fine, but I did not notice capsules.

Fontinalis antipyretica L. Beautifully festooning a fountain in the centre of the city of Wells.

Cryphæa heteromalla Mohr. Several localities near Burnham but very uncommon.

Leucodon sciuroides Schwæg. At Edithmead producing numerous gemmiform branchlets which are short, filiform, and minute-leaved.

Leskea polycarpa Ehrh. Two localities on trees by water near Mark Causeway; in one of these the moss was of a decidedly yellowish-green colour—Mr. Knight wrote: "*L. polycarpa* is usually green, but I have seen plants in this district (Cheltenham) like yours. I think it often assumes this colour when growing in dry or exposed situations."

Thuidium recognitum Lindb. In fair plenty in a meadow near Shapwick village.

Climacium dendroides Web. & Mohr. Marshy ground between Shapwick and Ashcott.

Camptothecium lutescens B. & S. Very plentiful on the Burnham sandhills, where it fruits freely near Berrow Church.

Brachythecium albicans B. & S. Rather common on Burnham sandhills, but capsules are very rare and local, though in one locality in a hollow near Burnham they are produced in some quantity. Mr. Wheldon writes:—"It is very abundant on our Lancashire dunes but only fruits sparingly and very locally."—*B cæspitosum* Dixon. Plentifully on the roots of trees by water in two meadows near Edithmead; Mr. Dixon writes:—"The moss you may safely refer to *B. cæspitosum*, I think. *Eurhynchium crassinervium* nearly always has the leaves more shrunken when dry, so that the branches are less julaceous."—**B. illecebrum* De Not. Very sparingly on clayey soil close to Brean Down.

Eurhynchium crassinervium B. & S. On stone in the garden of the Bishop's Palace at Wells; at the base of a wall in the village of Ashcott.—*E. prælongum* Hopk. forma. At the base of trees by water at Edithmead occurred a form towards var. *Stokesii* Brid.; Mr. Dixon wrote:—"I do not think your *Eur. prælongum* can be called more than an approach to var. *Stokesii*, from general texture and form of branch-leaves."—*E. circinatum* B. & S. In some quantity in crevices of the limestone on the south-east part of Brean Down.—*E. megapolitanum* Milde. Very fine but very local on the Burnham sandhills and fruiting profusely; in a trench to the south of the village of Brean, the fruit was produced in such quantity that I noticed the aggregated capsules almost hid the vegetative portion of the plant.

Amblystegium serpens B. & S. forma. A form towards var. *salinum* Carr. occurred in a hollow in the Burnham sandhills, and Mr. Dixon wrote:—"Your *A. serpens* is a form somewhat approaching the var. *salinum*, but it is not delicate enough to be referred to the var., I think."

Hypnum polygamum Schp. In the hollows of the sandhills near Berrow, on dampish ground.—*H. stellatum* Schreb. Marshy meadow near Shapwick Station, on peat.—**H. aduncum* var. *Wheldoni* Ren. Concerning this plant I have had much correspondence with Mr. Wheldon, which that gentleman has kindly summarized in a note on p. 273.—*H. aduncum* group *typicum* var. *gracilescens* forma *tenuis* Ren. Very sparingly in one place on the sandhills between Burnham and Berrow; "typical forma *tenuis*, Ren." J. A. Wheldon.—*H. aduncum* group *pseudo-fluitans* var. *paternum* Sanio. Very fine in various pools on the sandhills near Berrow Church; I also saw it in a sandhill pool close to the village of Brean.

CLADIUM MARISCUS R. BR. IN N. SOMERSET.

By Ida M. Roper, F.L.S.

Early in July I was much delighted to discover this plant growing and in full flower on Walton-in-Gordano Moor, North Somerset (v.c. 6). It is in fair quantity scattered for 100 yards in the bottom and sides of a rhine or drain, mingled with *Phragmites communis*, and the rhizomes of most of the clumps must be always in water with several feet of soft mud beneath.

It is difficult to understand how this large plant has been overlooked for so many years in the comparatively small Moor, and for local botanists the satisfaction of having it at length marked down is as great as it is unexpected.

That the *Cladium* is long established is certain from its condition and general surroundings, and the history of the Moor justifies its presence, although many other paludal species are wanting. The Gordano valley stretches from a three mile base at the mouth of the river Avon west of Bristol for some seven miles south-westwards, where the width is under half a mile; the name is stated to mean a valley narrowing to a point. The Severn Sea could overflow it only by way of the mouth, and it is shut out there by embankments which were erected under the great Bill of Sewers issued by Henry VIII. in 1531. Constantly re-appointed ever since, this historical body of Commissioners has always kept out the sea from the limited area (with serious floods occurring at times), and still holds its powers, altered by modern legislation and increased by numerous drainage Acts.

The surface of Walton Moor is rich grass-land on a peaty soil, and except from a few odd spots about 40 years ago, there is no local knowledge that any general peat-cutting for fuel has been done there within the last hundred years; the drainage system was laid down about that length of time ago, and the destruction of any *Cladium* was always assumed to have followed with similar fen species. The main rhines are cleared out twice each year.

Records of certain plants made by recognized observers exist from the neighbourhood for 136 years back from the present time, and during the early part of the nineteenth century, so they may be considered to have searched the Moor; about 35 years ago a thorough botanical survey of the whole was carried out, and much work has been done there more recently by local and visiting botanists—work made specially attractive by the ease by which the place can be reached within the ten mile radius of Bristol.

In ancient times the *Cladium* may have been distributed about all parts of the Fen districts, which stretched on both sides of the Severn from below Gloucester to Lundy Island, as quite modern records exist of its survival in very limited quantities both west of Glastonbury (N. Somerset, v.c. 6) as recorded in Mr. White's *Flora of Bristol* and Journ. Bot. 1918, p. 83, and near Wiveliscombe (S. Somerset, v.c. 5). Field-botanists will be encouraged by this discovery of *Cladium* in another district to hope that their own local rarities may after all be surviving.

SISYRINCHIUM BERMUDIANA L.

By Oliver Atkins Farwell.

[We are indebted to Mr. Farwell for a "separate" of the following paper, which appears in the *Memoirs of the Torrey Botanical Club*, xvii. 82–3 (issued June 10). In view of the interest of the subject to British botanists, we venture to assume permission to reprint Mr. Farwell's conclusions (which cannot be gainsaid) for the benefit of our readers.—Ed. Journ. Bot.]

Many botanists have in the past considered the pale-blue-flowered *Sisyrinchium Bermudiana* L., of the Atlantic coast, and the violet-blue *S. iridioides* Curtis, of Bermuda, to be conspecific, and have united them under the Linnæan name. Philip Miller, who cultivated both, side by side, considered them to be amply distinct and described them separately in the *Gardeners Dictionary* in 1768, but applied the Linnæan name to the Bermuda plant and renamed the Atlantic coast species as *S. angustifolium*. William Curtis, who, like Miller, knew both plants, also considered them to be distinct, and in the *Botanical Magazine*, plate 94, named the Bermuda plant *S. iridioides*; the date of the titlepage of volume 3 of the *Botanical Magazine* is 1790, but the printed date on the plate itself is September 1, 1789; the publication of the binomial must, therefore, date from that of the plate, 1789.

Modern botanists follow the interpretation of Philip Miller by applying the name *Sisyrinchium Bermudiana* L. to the plant that is endemic in the Bermudas, but this is contrary to the laws of priority as expressed in both the Vienna and American codes. Both of these species were described and illustrated by Plukenet in the *Almagestum* [p. 348, t. 61] under his genus *Sisyrinchium*; likewise by Dillenius in *Hortus Elthamensis* under the Tournefortian genus *Bermudiana*. Linnæus, in the *Species Plantarum*, p. 954, 1753, combined both species under the binomial *Sisyrinchium Bermudiana*, thus preserving to science both of the old generic names under each of which the species had previously been known. The specific name *Bermudiana* perpetuates an old generic name, and cannot be considered as having been given to the species as a geographical name to indicate the nativity of the species; had that been the idea actuating Linnæus, he in all probability would have given it the name *bermudiense*, adopting it from Plukenet, providing he had intended the Bermudian plant to be the type of the species. But Hemsley has already shown (*Journal of Botany*, xxii. 108–110, 1884) that Linnæus in all probability had never seen the plant from Bermuda. As a matter of fact he made the Bermuda plant his var. β, and considered it to be of such small categorical importance that he did not give to it even a varietal designation. That he intended the Virginia plant to represent typically his *S. Bermudiana* is clearly proved by the fact that all references to it were enumerated under his specific name and description, while those referring to the Bermuda plant were grouped under his unnamed variety β; and by the fact, which is still more to the point, that the explanatory note with its fuller description was drawn entirely from his "Planta a," *i. e.*, the Virginia plant. A careful study of all the evidence seems to indicate that:

1. Linnæus probably never saw the plant from Bermuda.
2. The specific name *Bermudiana* perpetuates an old generic name, and was not used as a geographical name to indicate the origin of the species; this view *per se* would prevent the adoption of the Bermuda plant as the type of the species.
3. The Linnæan descriptions (diagnosis and footnote) are based upon the plant from Virginia, which must therefore be taken to be the type of the species.
4. The plant from Bermuda should be known under the first name applicable to it, *S. iridioides* Curtis.

SHORT NOTES.

Drepanocladus aduncus (Hedw.) var. Wheldoni Ren. in N. Somerset. Amongst other interesting mosses (see p. 268) Mr. C. P. Hurst has recently added this new record to the Flora of North Somerset. He found it in some quantity on the Burnham sandhills, opposite Berrow Church, in 1916 and since. It was described by Renauld in *Revue Bryologique*, 1910, p. 29. From *D. aduncus* var. *falcatus* Ren. it may be distinguished by its usually stouter habit, and its distinctly dimorphous leaves, the cauline ones being erect, narrow, lanceolate-subulate (3–4 mm. long), the branch leaves smaller and relatively broader (1½–2 mm. long), usually more strongly falcate secund. The alar cells in mature leaves are yellowish or orange-coloured, and filled with granules which render them opaque. All the plants yet examined are either sterile or bear female flowers; capsules or male flowers have not yet been seen. In the Burnham specimens the perichætial bracts are sometimes all entire, but occasionally in some of the flowers the outer or lowermost bracts have the margins distantly toothed. Mr. Hurst's examples, collected on different dates in 1916 and 1917, show a considerable range of variation; due to age and differing edaphic factors. Some of the more robust plants, with elongate stems and leaves, diverge towards var. *aquaticus* Sanio: these are probably due to inundation at the critical period when growth is most active. Other smaller examples exactly match the type-specimens from the Lancashire coast. This variety is now extinct through drainage in v.c.s. Cheshire 58 and West Lancashire 60; it still occurs in S. Lancashire 59 (*Wheldon*), N. and E. Yorkshire 61 and 62 (*Ingham*); and in Canada (*H. Dupret*), where it is sometimes associated with the more abundant *D. aduncus* var. *falcatus* f. *subpiligera* Ren., a form which has not yet been detected in Europe. On the Lancashire sandhills *Harpidium cuspidatum* usually grows with *D. aduncus* var. *Wheldoni*, and often also *H. elodes* and *Amblystegium filicinum* var. *Whiteheadii*, though in time these more robust plants overwhelm it. It prefers damp bushy ground with some shade as a rule, whereas the two last grow in more open pools and ditches; but it is not easy to pin down the "Harpies" to any exact rule, and they often vary greatly in *facies* owing to slight differences in the variety of habitats they select. All the varieties of *D. aduncus* from var. *tenuis* to var. *aquaticus* are probably dependent on edaphic conditions; as Renauld has pointed out, to understand their origins, one has to work out the classification of all the forms which can then be grouped naturally together, and the best place to do this is in the field.—J. A. Wheldon.

"Lasses-Love." A recent novel by Mr. Halliwell Sutcliffe takes this title from a plant therein referred to, the description of which seemed to indicate *Santolina Chamæcyparissus* L. The name, however, is not included either in the *Dictionary of English Plant-names* or in the *English Dialect Dictionary*. I therefore wrote to Mr. Sutcliffe asking if he could send me a specimen of the plant, which he kindly did, thus confirming my suspicions, with a note which seems of sufficient interest for publication. He writes: "I am very glad to be able to enclose a sprig of 'Lasses-Love.' The point you raise as to the name has interested me for many years past; for I only know of one corner of Yorkshire where this folk-name is used—the Haworth moorland, which is the scene of the book . . . . As regards the local use of 'Lasses-Love,' a friend of mine, living in the Haworth country, was approached by a neighbour who had seen the name used in a book of mine and who stated roundly that it was a fiction of my own. The answer was, 'If you don't know the herb by that name, it is plain your roots don't go deep into moorland soil.'" "French Lavender" is another name given for the plant in the book, in which also occurs "Lad's Love"—a common name for *Artemisia Abrotanum*, which has a similar scent.—James Britten.

Oxalis americana. In *Rhodora* for April Prof. M. L. Fernald establishes this as a species distinct from *O. Acetosella*, with which it had generally been regarded as conspecific. It had been separated by Bigelow, who communicated a description to De Candolle which was published by the latter in Prodr. i. 700 (1824); but in the same year Bigelow (Fl. Bost. ed. 2, 258) withdrew the species (which indeed he himself had never published), considering the European and American plants identical. The distinction was recognized by Zuccarini in 1825 and 1831, but "all subsequent authors have followed Bigelow's own printed statement and have not attempted to separate the American from the European plant." In distribution the former "belongs distinctly in the Canadian zone, overlapping slightly into the Hudsonian, where it occurs in cool mossy woods"; the European, Prof. Fernald regards as "growing in apparently much drier open habitats." The time of flowering also differs: "it would seem that *O. Acetosella* of Europe is one of the early spring flowers of open sunny woods, while its North American representative is a summer-flowering plant of the dense Canadian spruce and fir forests." The difference in habitat—at any rate, in Britain—is not as great as Prof. Fernald supposes: with us the Wood Sorrel occurs mostly on moist shady hedgebanks, often among moss. Numerous differences in the flowers, capsules, seeds, and other features are pointed out, and, with the difference in distribution, "indicate that De Candolle and Zuccarini were correct in maintaining the American plant as a distinct species, and that Bigelow's first impulse to separate the American plant was well founded, although he afterwards, from failing to observe the numerous concomitant characters, reduced his own species." It is interesting to note that the variety *subpurpurascens* DC., of *O. Acetosella*, has its analogue in the American species; Prof. Fernald, rightly regarding this as "merely a colour form" names it forma *rhodantha*.

Brake Fern on an Oak. Recently when valuing the timber in a mixed wood on Tickenham Hill, Somerset, I observed a couple of ordinary sized Brake ferns (2½–3 ft. high) growing with Polypody and a rooted bramble in the basin of a large pollard Oak. Though very rough, the Oak is apparently sound, and measures thirteen feet in circumference; and the sort of basin formed by the branches is nine feet above ground, and doubtless holds both humus and water.

I do not remember seeing or hearing of Bracken epiphytic upon a tree; although this fern is so tenacious of life and sometimes appears in strange places—for example, about six years ago a few small fronds had pushed their way between the stone steps outside the Senate House at Cambridge.—H. S. THOMPSON.

MIMULUS MOSCHATUS. Reference has been made to the frequent scentlessness of *Mimulus moschatus*: from a note in *The Garden* of August 10 (p. 302) it would appear that the scent appears and disappears in the same plant: "Last year it was fragrant as of yore. This spring I eagerly awaited it and it came up scentless. But a few days ago, after a thunderstorm, its perfume returned." In the same paper for Aug. 24 (p. 320) another correspondent writes:—"I have studied *Mimulus moschatus* now for close on fifteen years in order to try to find some solution for its gradual loss of scent. Five or six years ago plants could still be found which retained their scent; but now it seems impossible to find any with the least suspicion of it. I have observed the musk in many places, including several in Scotland and in all parts of England. I have never during all these years seen it visited by insects, and I have come to the conclusion that it has arrived at self-fertilization and so no longer needs to manufacture scent to attract insects. I wonder if anyone else has noticed this. I can remember watching flies and bees visiting it when I was a child."

GEUM CHILOENSE. In looking through Maund's *Botanic Garden* I find a note on the plant usually known by this name in which it is stated that in Sweet's *British Flower Garden* it is called *G. Quellyon*. The latter name is quoted in *Index Kewensis* as of "Hort. Edinb. ex Lindl. Bot. Reg. sub t 1348," no reference being made to its publication by Sweet: *G. chiloense*, to which it is referred, is cited as of "Balb. ex Ser. in DC. Prod. ii. 551." Seringe, however, merely quotes Balbis's name as a synonym of *G. coccineum* Sibth. & Sm., with which it was at that time regarded as identical. Lindley (Bot. Reg. 1088) also places Balbis's plant, of which he gives a full description based on plants communicated by that author to the garden of the Horticultural Society, under *G. coccineum*, but expresses the strongest doubt whether the Greek and the Chilian plants were identical; this doubt a subsequent investigation of Sibthorp's specimen enabled him to confirm in Bot. Reg t. 1348, where he adopts the name *chilense* (so spelt) for the species. Meanwhile Sweet (*l. c.*) had already published the plant as *G. Quellyon*—a native name quoted by Feuillée, to whose description of the plant Lambert had directed his attention: and this, by Art. 37 of the Vienna Rules which states that "citation in synonymy is not valid," is the name which must stand, as the following table will show:

GEUM QUELLYON Sweet, Brit. Fl. Gard. iii. 292 (March, 1829): Hort. Ed. ex Lindl. Bot. Reg. 1348 in syn.
  G. coccineum Ser. in DC. Prodr. ii. 551 (1825); Lindl. Bot. Reg. 1088 (1827); Ind. Kew. i. 1026: non Sibth. & Sm.
  G. chiloense Balb. ex Ser. *l. c.* in syn.; ex Lindl. *l. c.* in syn.
  G. chilense Lindl. Bot. Reg. 1348 (Aug. 1830).
  G. chiloense Maund, Bot. Gard. iii. n. 273 (Sept. 1830).

The plant is so commonly (though inaccurately) known in gardens as *G. coccineum* that no general inconvenience will result from the change, which, as I have said, would seem to be necessary if the Vienna Rules be followed.—JAMES BRITTEN.

LILIUM MARTAGON L. The following extract from a letter from John Stuart Mill to Sir William Hooker, dated 26 January, 1831, preserved in the Hooker correspondence at Kew, seems worth printing: "I send you . . . the *Lilium Martagon*, a plant new to the British flora, but certainly wild, and, as far as it is possible to judge, indigenous. It fills, as I imagine, nearly the whole of an extremely thick and close coppice wood, near Headley in Surrey. I first saw it about four years ago, when the coppice, or rather a part of it, was cut down, and the ground was seen to be covered with this plant; but as it never flowered I did not know what it was, though I wondered at it a good deal; but in June this year (I believe shortly after I wrote the notes on your Flora to which I owe the privilege of corresponding with you) I discovered in another corner of the wood a considerable number of full-grown plants all of them on the point of flowering, two of which I gathered and now send to you. They are badly preserved, but there is no doubt of the identity of the plant, and as little of its being completely wild: if it ever escaped from a garden, it must have been at a very remote period, for there is no garden near, and the immense abundance of the plant in this coppice proves that, if not indigenous, it is as completely naturalized as a plant can possibly be." From this it would seem that Mr. Dunn's note (*Alien Flora*, p. 183) —"commonly cultivated in gardens in England and recorded in many localities as naturalised in their neighbourhood"—is curiously misleading so far as this first recorded habitat is concerned. Mill referred to this letter in a note to Alexander Irvine printed in the *Phytologist* (N. S. ii. 554), where he says: "About 1829 I found it in flower, and, I believe, wrote to Sir W. Hooker about it; but he, as you know, repudiated it as a British plant." The plant was figured in E. Bot. Suppl. t. 2799 (May 1, 1837); the accompanying text states that the copse at Woodmanstone, five miles from Epsom, whence the specimen was sent, is locally known as "Turk's-cap Shaw"; "it is remembered by the older people of the neighbourhood to have flourished truly wild in that locality for more than half a century." From this locality it is recorded in Loudon's Mag. Nat. Hist. iii. 152 (1830).

"ENGLISH BOTANY." In connection with the reference on p. 249 it may be worth while to transcribe the following paragraph in *Loudon's Magazine of Natural History* (i. 304; 1828), from which it will be seen that the parallel between the descriptions and the illustrations of this work and *The Cambridge British Flora* is closer than was indicated. An anonymous correspondent had endeavoured to claim for Sowerby a greater share in English Botany than could be rightly attributed to him: "Mr. James Sowerby's name," he says, "should be stated as the projector of that great and useful work," and it is added that Sowerby wrote "a part of the first volume himself." On this his son, James de Carle Sowerby, wrote as follows:—

"At p. 198 I have observed that some well-meaning friend, desirous of doing a service to the memory of my lamented father in claiming for him his share of the honour due for the execution of that national work the *English Botany*, has rather overshot the mark: Mr. Sowerby was not the author of any part of the text of *English Botany*. The work owed its origin to the circumstance of Mr. Sowerby having made a number of sketches of plants, to be introduced in the foregrounds of landscapes, which he was in the habit of painting from nature. These sketches were shown to various botanical friends, at whose suggestion the work was begun, with the valuable assistance of Sir J. E. Smith; and the only descriptions that were not written by that gentleman were supplied by the late Dr. Shaw [tt. 16–18]. In addition to the praise due to Mr. Sowerby for the excellence of the drawings and engravings in that work, some portion is due to him for the spirit of enterprise in which he carried it on; for, although he had to depend upon portrait-painting for the capital required, he still industriously and steadily pursued his expensive project until it began to remunerate him (which was not for several years), and he finally brought up a numerous family to enjoy its profits and lament the loss of one of the best of parents."

REVIEW.

The Botany of Iceland: edited by L. Kolderup Rosenvinge and Eug. Warming.—Part II.: 3. Ernst Oestrup: Marine Diatoms from the Coasts of Iceland (with one plate). 4. Aug. Hesselbo: The Bryophyta of Iceland (with 39 figures in the text). 1918, pp. 345–677. Copenhagen: J. Frimodt. London: Wheldon.

Part I. of this work appeared in 1914 and contained two memoirs—the Marine Algal Vegetation, by Helgi Jónsson; and the Physical Geography, by Th. Thoroddsen: part II. contains the Marine Diatoms and the Bryophyta, and completes the first volume of the work.

The monograph of the Marine Diatoms is based on the gatherings made by various collectors on the coasts of Iceland; the author, Ernst Oestrup, tells us that this material consisted of 438 samples and yielded upon examination 209 species and varieties, arranged in 42 genera. Seven new species and four new varieties are described, and are all figured. The records are first presented in the form of a systematic enumeration, with references, distribution, etc.; and, secondly, in alphabetical order in a tabular survey, wherein is shown the distribution of each diatom throughout the world, in Greenland and the Arctic Ocean, and around the coasts of Iceland respectively. Another table serves to show the frequency of occurrence of the commoner species. The relation between the larger Algæ and the Diatoms is elaborated in other tables, where lists of Rhodophyceæ, Phæophyceæ and Chlorophyceæ are given together with the Diatoms that have been found to be characteristically associated with each particular genus.

The account of the Bryophyta has been prepared by Aug. Hesselbo from his own collections and investigations, from those of Chr. Grönlund made some fifty years ago, and from those of three Iceland botanists—Ólafur Davidsson, Stefán Stefánsson, and Helgi Jónsson.

The older records of Hooker, Lindsay, Carroll, etc., are alluded to without enthusiasm. About half the text is devoted to a systematic enumeration of the Bryophyta, the numbers of which are as follows:—Hepaticæ 90, Sphagnales 20, Musci veri 325. Among the mosses three new species and three new varieties are described and figured; and critical notes of some length are appended to several difficult species. The habitats, plant-associations, and distribution are treated with much care—as, indeed, is necessary in case of a country where such extremes of temperature occur—from glacial ice to boiling springs.

It is the ecological side of Mr. Hesselbo's work that is of prime importance and interest. The long chapter on the Bryophyte Communities is divided into the Lowland Formations and the Vegetation of the Mountain Heights. But while the moss-formations of the highlands, and of the heaths, rocks, tuff rocks, and lava-fields, are carefully summarised and are of great value and importance, it is the conditions that prevail near the hot springs that afford the principal novelty for the British bryologist.

The vegetation of bogs is entirely different from that of ground which is inundated or saturated by the pure water of running streams; for the bog-water is stagnant, contains humic substances, lacks aeration, and is warmed by the sun; whereas spring-water is clear, contains oxygen and carbonic acid, and has a very low summer temperature (4° to 6° C.). Mr. Hesselbo has much to say about the vegetation characteristic of the different sorts of bogs and streams. But Iceland also abounds in hot springs, and these are of two kinds—the alkaline and the sulphur springs. The alkaline springs occur where no recent volcanic activity has been manifested; they contain pure clear water which often deposits siliceous sinter, and are always surrounded by a luxuriant vegetation. The sulphur springs are most numerous where volcanic activity is still felt; they contain sulphuretted hydrogen and deposit sulphur; and the soil around them is much decomposed by the acid vapours evolved, and is turned into a red or yellow clay; the vegetation around is very scanty. The Great Geysir falls into the second category; and it is interesting to note that the bread for the neighbouring farmhouse is baked in pots buried in the hot soil.

The vegetation of these warm grounds depends upon the chemical nature of the water and of the escaping vapours and upon the condition of the soil. Where the water is free from sulphuretted hydrogen, and the surroundings are boggy, and warm vapours are evolved, a broad belt of deep *Sphagnum* cushions with a temperature as high as 50° C. may occur, the most frequent species being *S. papillosum*. And, as a rule, scattered in the cushions are found a strong fruiting form of *Polytrichum commune*, *Hypnum stramineum*, *Hylocomium squarrosum*, or *Acrocladium cuspidatum*. Outside the *Sphagnum* belt, there occurs on warm boggy soil (tem. 25°–30° C.), a moss carpet chiefly composed of *Hypnum imponens* and *H. Lindbergii*, with *H. stramineum*, *Hylocomium squarrosum*. *Acrocladium cuspidatum*, *Thuidium delicatulum*, and numerous other bog-mosses, such as *Hypnum revolvens*, *H. molluscum*, *Catoscopium nigritum*, *Fissidens osmundoides*, *Scapania irrigua*, *Pellia Neesiana*, *Aneura pinguis*, etc. Sometimes the moss carpet consists only of an elongated slender form of *Philonotis fontana*, or of *Aulacomnium palustre*. On dryer clayey ground (20°–40° C.) the Hypnaceous carpet is replaced by sterile mats of *Archidium phascoides* 1–2 cm. high, which have been mistaken by earlier collectors for stunted forms of *Leskea*, *Catoscopium*, *Pohlia*, *Amblystegium*; and in these mats may be found *Campylopus flexuosus*, *C. fragilis*, *Oligotrichum hercynicum*, *Catharinea undulata*, *Gymnocolea inflata*, and sundry other species.

In damp clayey soil along the outlets of the hot springs, pure or slightly sulphuretted, a low Bryophyte carpet occurs, chiefly composed of thermophilous hepatics—*Fossombronia Dumortieri*. *Anthoceros punctatus*, *Haplozia crenulata*, *Alicularia scalaris*, and with them *Oligotrichum hercynicum*. Near the sulphur springs *Sphagnum* and the Hypnaceæ are entirely absent, whereas many of the Hepaticæ are to be found—the species just mentioned and *Gymnocolea inflata* and *Preissia commutata*, together with *Archidium phascoides*, *Polytrichum commune*, and a few other mosses. *Riccia bifurca*, *R. sorocarpa*, and *R. crystallina* are especially fond of the dry warm ground near sulphur springs. It should be added that blue-green Algæ were growing in hot overflows on siliceous sinter at temperatures as high as 60°–70° C.

The text is illustrated by a number of process blocks, which are of material assistance in picturing the scenery discussed in the paper.

A. Gepp.

BOOK-NOTES, NEWS, ETC.

The *Transactions of the British Mycological Society* for 1917 (Vol. vi, part 1; Aug. 17: price to non-members 10*s.* 6*d.*) begins with a Report of the foray at Shrewsbury in September last, by the Hon. Secretary, Mr. Carleton Rea, who gives a complete list of the Fungi noted, to which Miss Lister adds one of the Mycetozoa. Miss A. Lorrain Smith, besides her Presidential Address on "The Relation of Fungi to other Organisms," contributes a paper on "Hyphomycetes and the Rotting of Timber"; descriptions of "New or Rare Micro-fungi" (with Mr. Ramsbottom) which include a new genus, *Disocera*, discovered in Somersetshire on the thallus of a lichen by Mr. W. Watson; and a notice of W. G. Smith as a mycologist. Dr. Jessie Bayliss Elliott describes and figures "New Species of Fungi Imperfecti" and writes on "The Method and Growth of the Conidial Clusters of *Trichothecium roseum*." Miss E. M. Wakefield contributes a paper "On the Biology of some Sand-dune Fungi" and (with Mr. A. A. Pearson) describes and figures "Resupinate Hymenomycetes from Weybridge"; Mr. Pearson also writes on "Two-spored Basidia." Mr. Rea's description of "New and Rare British Fungi" is accompanied by one of Mrs. Rea's excellent coloured plates. We note with interest that Lichenology is to be added to the Society's field of activity. The Society is to be congratulated on the publication, in these difficult times, of so substantial a contribution to knowledge;

our only regret is that so little attention is paid to typographical arrangement: the type itself is excellent, but the arrangement could hardly be worse; and the methods of citation—*e. g.* "Boletus lacteus Lév. Lév. An. sc. n. (1848), 124"—often leave much to be desired.

The Flora of Wimbledon Common (Taylor & Francis, 1*s.* n.) is an address given by Mr. A. A. Pearson to the John Evelyn Club in December last, to which is added a list of the species (including vascular cryptogams and fungi) recently recorded. The address, which is written in an interesting manner, takes the form of "a walk" across the Common: "it can be at any period of the year, so you must try to enlarge your powers of vision in order to embrace all the seasons." The appended list, which includes about 400 flowering plants and 330 fungi, is a useful record as showing the existing flora of a district so close to London. "Herb Willow" (p. 8) should be Willowherb.

Mr. E. A. Bowles contributes to *The Journal of the Royal Horticultural Society* (xliii. part 1, May) an interesting paper on "Snowdrops," illustrated by sixteen plates. Mr. Bowles divides the genus into four "groups," of which *G. nivalis*, *G. plicatus*, *G. latifolius*, and *G. Elwesii* are the types: "the single form of *G. nivalis*, that has spread so freely in some parts of Great Britain as to be reckoned one of our wild flowers, was probably introduced by the Romans."

Science Progress (July, 5*s.* n.: Murray) continues to deserve its name: judging from the survey of Botany by Dr. E. J. Salisbury, the record is very complete. The review is admirably printed; but the system of page-heading—a subject to which we called attention last year (Journ. Bot. 1917, 288) could hardly be worse. The left-hand pages are rightly headed with the title of the review; the right-hand, up to p. 63, are uniformly headed "Recent Advances in Science"; then follow "Articles" (to p. 85), "Popular Science" (to p. 95), "Notes" (to p. 123), "Essays"—there is only one—(to p. 129)," "Essay-Reviews" (to p. 145) and "Reviews" (to p. 167): could anything be less helpful or less illuminative?

The *Annals of Botany* issued in July contains an interesting paper by Dr. J. C. Willis on "The Source and Distribution of the New Zealand Flora"; a study of "The Genus *Caltha* in the Southern Hemisphere," with descriptions of three new species, by Captain A. W. Hill; "Studies on East Indian Hepaticæ" by D. H. Campbell; a paper by Dr. Scott on "The Structure of *Mesoxylon multirame*," and other articles.

Mr. Horace A. Vachell presumes too much on the knowledge of botanists. In his novel *The Waters of Jordan* (chap. vii.) he tells us that a New Forest rector named Vennable "had published a monograph upon fungi, with special reference to the rare species of boletus discovered by him and named—as botanists know—*Edulis Vennabilis*." Later Mr. Vennable (chap. xv.) raised the variety to the rank of a species—"I found the *Boletus Vennabilis*."

LAMINARIACEÆ OF ORKNEY:

Their Ecology and Economics.

By Magnus Spence
(Deerness, Orkney).

Our Northern Seas round Orcades have long been noted for the large amount of seaweed cast upon our shores. Two reasons may be given for this: (1) the water is comparatively shallow, with rocky ridges and sunken skerries here and there, on which Laminarias find a congenial habitat; (2) no part of the British area has so high a record for gales as Orkney and Shetland, and there is little doubt that the rough turmoil of the sea produces more vigorous plants than the quieter waters of the English Channel. The fact remains that for beauty and luxuriance the larger Laminarians of Orkney are not surpassed by those of any other part of the British Isles.

I. Laminaria Cloustoni Le Jolis. Two tangles have been confused under the older name of *L. digitata* L., as by Linnæus himself and still older writers. These are conveniently known respectively as *L. Cloustoni* and *L. flexicaulis* of Le Jolis. The old name *L. digitata* might have been retained for the larger form, and was definitely isolated for this type by Harvey (Phyc. Brit. pl. 223), beyond any possible doubt; the other plant being isolated as var. *stenophylla* (pl. 338). But a more usual custom, based on herbarium specimens, has carried on the *L. digitata* to the smaller *L. flexicaulis*, since only of this plant were specimens ever obtained small enough to go on the herbarium sheets. To avoid confusion *L. flexicaulis* admirably expresses the distinctive feature of one form, while *L. Cloustoni* (= *L. hyperborea* of Norwegian writers) is less fantastic, and commemorates Charles Clouston (1800–84), an Orkney algologist.

L. flexicaulis is a tangle seen much less on northern shores than *L. Cloustoni*: the latter is the common tangle in Orcadian waters. It is known as the "Red Tangle," while the former is the "Black Tangle." During last winter not more than five per cent. of the tangles on the beach were *L. flexicaulis*, but in May the proportion had risen to 15 per cent. By May the "Cuvy," as *L. Cloustoni* is generally termed, had shed its frond, and the rough sea had less power to tear it from its hold-fast, which may easily account for the difference per cent. The Red Tangle is really brown when fresh, but when carted on the land as manure, and exposed to the rain and sun, the fronds become red, and remain so after three months' exposure; hence the name. These two tangles occupy different zones of tidal waters; during spring tides *L. flexicaulis* is readily found growing in pools and on the sea-bottom, before reaching the level of *L. Cloustoni*; the latter is never fully exposed, only the most stunted stems at the higher level being found out of the water, and the tops of the next lower down. At extreme low-tides they can be seen crowded together in miniature forests; growing in deeper water in "close canopy," and bending in the break of heavy swell, in the manner of a gust of wind passing over a field of corn.

The most interesting phase of the existence of this plant is when it casts its frond in April and May. The new lamina begins to grow at the apex of the stem, pushing on the old frond with its sori already exhausted or still continuing to produce "sporangia." The old fronds may be encrusted with polyzoa, and become much hardened. The new frond, at first entire, and as much as 6–8 inches each way, shows a narrow detached segment on each side, and begins to split into 3 or 4 parts, though still securely holding the old frond. With further extension to as much as 10 inches in length and breadth, new subdivisions are added, ultimately as many as 30 in fine plants; and by this time the ends connected with the old frond are attenuated and weakened, so that the first gale, or even strong wind breaks the last links, *and tens of thousands* are landed on the beach. This is the farmer's and kelper's opportunity. Many farmers will leave their "bere" (of barley) unsown till this "*breaking the ware*" occurs. They then have a busy time carting and spreading it on their land: about the middle of May this year I saw many hundred cart-loads of cast-off fronds along a bay only half a mile across. After a strong gale in winter, heaps as high as a cart have accumulated in the more favoured recesses of the bay. The farmer backs his cart up to the bank, but then the tangles are so interwoven that it is impossible to lift the tangled mass. However, with a sharp garden-spade he makes a cut parallel with the edge of the heap, and loading becomes an easy matter.

L. Cloustoni is the least flexible of any of the tangles—in fact it resembles a stout walking-stick, with rough corrugated bark, commonly covered with epiphytic Florideæ. A good plant weighs more than 4 lbs. The length of the stem, when a few years old, averages 5 ft., and the longest I have measured was 6½ ft.; but a farmer in Stronsay tells me he has measured one of 7 ft. The circumference just above the root averages 5½ inches, and the thickest I have seen was 7 inches. On cutting across the stipe, annual rings of growth can be seen, which afford a guide to the age of the plant. The strong roots, or haptera, grow to a stout cage-like mass, 8 inches each way; the members being arranged in fairly strict orthostichies, and few in number. As a general result of adding only one member each year to an orthostichy line, the age of the plant is roughly determined externally by counting the number in the vertical rows.

II. L. FLEXICAULIS Le Jolis has a flexible stipe of 3½ ft., but often a long frond: I measured one last June which was 7 ft. In Deer Sound, in a long well-sheltered bay, *L. flexicaulis* grows in fair abundance; but specimens are seldom cast ashore. In April this year I got among a quarter of an acre exclusively covered by these, none of which had attained the size either in stipe or frond of those in the open sea; but the fronds were undivided, 2–3 ft. long and broad, curving over the stipe like a shoemaker's leather apron. This is the var. *cucullata* Le Jolis, found at Faeroe (Börgesen) and in quiet water of Norwegian Fjords.

It is interesting to note that though Clouston's description of the Orkney "Cuvy" was particularly vivid and correct, his ideas of the

L. flexicaulis-form appear to have been based on a still larger plant' described as having a stipe of 8–10 ft., and a circumference seldom exceeding 4 inches (!); flexible, lying on the rocks, with a smooth polished surface, free from all epiphytes. This plant, still unknown, may be the North American *L. longicruris*, specimens of which as drift are recorded by Orkney fishermen, though not seen in recent years; but these are covered with barnacles, and are clearly old water-worn plants, drifted as the rate of passage suggests for probably as much as twelve months. More recently (1903) Börgesen (in *Botany of the Faeroes*, ii. p. 454) has described as *L. faeroensis* a very similar huge frond as growing at the Faeroes, with a lamina as big as a small tablecloth, and a similar hollow stem, 1 inch in diameter. It will be of great interest to see if it is possible to find Börgesen's plant growing in sheltered bays at Orkney, as recorded by Clouston (1834). It was on the strength of such records of barnacle-covered drift that Harvey included *L. longicruris* as British in his Phyc. Brit. (pl. 339).

In Clouston's classical account of *L. Cloustoni* in Anderson's *Guide to the Highlands and Islands*, he gave the name of the plant as "Cuvy." Cuvy is the old Orcadian name, and is of Norse derivation, as are all local names of places, flowers, and seaweeds. It is derived from the Norwegian *Kuv*, old Norse *Kufr*, a rounded top; Norwegian *Kuva*, to round off, to stump, to dock: the same word Cuvy (or Kuivy) is applied to the stump of a horse's tail. Cuvy is thus a very appropriate term for *L. Cloustoni* in spring, when the stipe is docked of its frond. The sea-beach I know best is a gently sloping one with a south-east exposure, and fully a mile in length. After a south-east gale the whole beach is covered to a depth of a few feet with seaweed, mainly *L. Cloustoni*; a moderate estimate of the numbers cast ashore during winter is a hundred to the lineal yard; a very small fraction of this amount is made use of; the rest are covered with sand, or decay, or during a high tide may be swept out to sea again, and disappear.

III. ALARIA ESCULENTA Greville is one of our handsomest seaweeds; its long wavy fronds, with midrib running its whole length gives it the appearance of a long snaky ribbon; the Orcadian name for this plant is "Myrkals," which Dr. Jacobsen derives from Faeroese *Mirkjallur*, the leaf-ridge of the edible tangle; the midrib varies from $\frac{1}{4}$ to $\frac{1}{2}$ inch in breadth, and the plant receives its name from its winged appearance. It grows in the same localities as *L. flexicaulis*, or higher up the tide-range, and is pre-eminently the "surf-plant" of the *Laminariaceæ*. At spring tides its long fronds can be reached in pools and on shelving rocks; one shelving rock had at least a dozen 14 ft. long Alarias, just within the limits of low-water mark. The whole plant is so tenuous that a storm tears the lamina to pieces before it is beached. The longest I have seen was 21 ft. No doubt many are longer, but the rough sea makes mincemeat of most of them. The stipe varies from 1 to $1\frac{1}{2}$ ft. in length, and on each side of this a bundle of "sporophylls" grow from 6 to 10 inches long, and $\frac{1}{2}$ to 1 inch broad; on these the reproductive organs are borne.

The interesting point here is that these "sporophylls" are shed annually, after they are exhausted in reproduction; and before the old ones are detached a new set of from 20 to 30 are growing just a step higher up on the stipe. Now, assuming that the number of sporophylls remains equal, the small scars of the older ones are left as prominent marks on the stipe, and by this means the age of the plant may be approximately ascertained. Specimens with no sporophylls are of the first year's growth, while those without pit-scars are of the second year; the latter I have found 8 ft. in length. By counting the scars one can safely reckon on individuals of six, eight, and even ten years' growth. This plant is cast on shore abundantly in spring and early summer; few figures do justice to the beauty of the full-grown plant. The first illustration by Lightfoot, Flora Scot. tab. 28 (1777), gives the best idea of its proportions; that of *English Botany*, tab. 1759 (1835) the best study of the old and young sporophylls and the pit-scars of older years; but the lamina is trivial A fine frond 20 ft. long, and 10 inches broad at the widest part, is the finest seaweed lamina of these latitudes.

IV. SACCORHIZA BULBOSA De la Pylaie is beyond question the most remarkable of indigenous Laminarias, and is also a unique monotype of the North Atlantic seaboard. During the winter months many half-grown plants come ashore with the full round "bulb" attached. The broad stipe can then be seen at the different stages of growth; in some the frill or "furbelow" is seen in its various initial stages—smooth, slightly wavy, and half developed. In late spring and summer the bulb is so firmly fixed by many haptera which have developed on the under side, inside the bulb edge, and at the end of the stipe, that unless the stone to which it is attached comes too, it breaks off at the junction of bulb and stipe, at the point marked by the extra spiral twist. The great plant is thus washed up with its furbelow, but without the bulb; and as the end of the stipe may bring some haptera with it, one wonders if it is the same plant with huge furbelow, up to 3 inches deep, and in as many as 30 waves, but no bulb. Fine plants with fronds spread over 6 ft. each way, give an impression wholly different from any published figures of this plant, the uncouth appearance of many drawings and herbarium specimens being due to the fact that they represent depauperated, immature and small specimens. The plant is not so much *annual* as monocarpic, and fine plants continuing over the spring may be in full reproduction in the end of the summer (September, of the second season) though the laminæ may be much worn. Examination of such old plants in the reproductive condition has led to the curious misstatement (Kjellman, 1893) that the cuticle is not continuous over the paraphyses, but that the latter are wholly free from each other. As a matter of fact, the cuticle in *Saccorhiza* strips as well as in any other *Laminaria*; but once stripped, of course it is not again seen.

V. LAMINARIA SACCHARINA L., a very common plant on the Orcadian coast, also attains a maturity far beyond that observed in the English Channel, and a fine plant ten feet long, with broad fully-frilled and "bullated" lamina, 10 inches wide, is one of the most handsome of plant-forms. The finest specimens strew the beach in June and July, when the new season's lamina has reached its maximum growth. The stout stipe is usually only 12–18 inches in length, and not more than 10 mm. in diameter, usually less. A point of interest is seen in the fact that many individuals, not different so far as can be seen from others, yet have mucilage-ducts in the stipe—a feature which has been largely utilized in delimiting "species." Interest also centres in the peculiar corrugation of the fronds; the "bullation" as it was termed by older writers who only knew plants of quiet harbours, with undulated "midrib" region and lateral waved folds or "bullæ" of Gmelin, and Stackhouse (1795). All stages in the intensity of such corrugation may be seen in one fine specimen, the amount being greater at the base of the lamina and passing into a close system of irregular corrugations, which, in the limit, extend right up to the margin of the lamina. A fine lamina 8 inches or more in width, corrugated finely and closely right up to the straight margin, resembles a piece of wrinkled thick leather-belting, and is like no other British plant. Smaller forms, similarly corrugated, from exposed shores of the Faeroes, have been distinguished as var. *linearis* Börgesen (1903); but there is nothing "linear" about these fine plants, again wholly different from the general illustrations of the type, as for example the feeble specimens of the Phyc. Brit. pl. 289, with no bullation at all.

NEW OR NOTEWORTHY FUNGI.—PART VI.

By W. B. Grove, M.A.

(Plate 550.)

This notice of New or Noteworthy Fungi is a continuation of Part V, which appeared in the *Journal of Botany* in July and August, 1916. The new British fungi contained in the list owe the greater part of their interest to the exceptional keenness of sight possessed by Mr. D. A. Boyd, of Saltcoats, Ayrshire, by whom most of them have been discovered. That part of Scotland is exceedingly rich in Fungi Imperfecti. There are also included a few species discovered by the late Dr. J. W. Ellis, of Liverpool, who sent them to me shortly before his much lamented death. The Birmingham Natural History Society has kindly made a grant, from the Endowment of Research Fund, towards defraying the cost of the plate. I owe thanks also to Miss E. M. Wakefield, of Kew, and others, for help in various ways.

Ascomycetes.

253. **Mycosphærella Cydoniæ**, sp. n.

Maculis nullis. Peritheciis hypophyllis, in greges parvos rotundatos digestis, rarius sparsis, ca. 100 μ diam., subglobosis, nigris, nitidis, immersis, dein papilla crassa emergentibus; contextu e cellulis laxis atro-fuscis inæqualibus conflato. Ascis oblongo-cylindricis v. subclavatis, utrinque obtusissimis, aparaphysatis, fasciculatis, ca. 45 × 5 μ; sporidiis plus minusve oblique monostichis, subinde parte superiore distichis, obovoideis, uniseptatis, leviter constrictis, 7–10 × $2\frac{1}{2}$–3 μ (ut plurimum 8 μ longis), hyalinis, eguttulatis, loculo inferiore angustiore. (Tab. 550, f. 1.)

Hab. in foliis aridis emortuis humi jacentibus *Cydoniæ vulgaris*, Hereford, vere, 1917–18 (Maio, etc.).

The perithecia are confined to the lower surface, and, though they are sometimes concealed amidst the tomentum, more often the part occupied by them is nearly glabrous. In the winter the perithecia are to be found, but spore-less: the asci mature as summer approaches. On pressure, the group of asci emerges from the perithecium as a globular fasciculate coherent cluster, consisting of 200 or more, and reminding one strongly of those of *Sphærulina abbreviata* on *Rubus*. The texture of the perithecial wall is unusually loose and irregular. This species is near to *Sphærella Pomacearum* Sacc., but differs from the insufficient description of that in several important particulars.

254. LEPTOSPHÆRIA GALIORUM Sacc. Syll. ii. 22.
f. *Dipsaci*.

Peritheciis subgregariis, tectis, globuloso-depressis, nigris, $\frac{1}{6}$–$\frac{1}{5}$ mm. lat., ostiolo papillato erumpente; ascis clavatis, longiuscule stipitatis, 90 × 14 μ (part. sporif.), paraphysatis, 8-sporis; paraphysibus clavulatis, crassis, hyalinis, minute guttulatis, subseptatis, inæqualibus; sporidiis oblique monostichis v. subdistichis, oblongo-fusoideis, obtusis, sæpe curvulis, initio luteis, grosse biguttulatis, dein triseptatis, brunneis, subopacis, 21–23 × $5\frac{1}{2}$–$6\frac{1}{2}$ μ, ad septa vix v. perparum constrictis. (Tab. 550. f. 2,)

Hab. in caulibus emortuis *Dipsaci silvestris*, Salwarpe, prope Droitwich, Julio.

255. NECTRIA MAGNUSIANA Rehm, Ascom, no. 436. Sacc. Syll. ii. 486.

Status conidicus (*Tremella aurantiaca*):—Sporodochia densely crowded (20–40 together in one disc), angular by mutual compression, surface at first convex, then depressed, wrinkled or umbilicate, soft, outside reddish-brown, disc orange-scarlet, $\frac{1}{8}$–$\frac{1}{4}$ mm. diam. Spores allantoid, 5–6 × 1 μ, very numerous; sporophores long, about the same width, many times fasciculately branched.

Parasitic on the disc of the tubercles of *Diatrypella favacea* C. & DN., on branches of *Betula alba*, from a dead trunk lying on the ground in Gt. Barr Park (St.), May.

The shape of an average sporodochium would be well represented by a model of a human molar tooth. Although the fungus was very abundant, more than six feet of the branches of the host being occupied by the many tubercles of the *Diatrypella* and nearly every tubercle being covered and almost obliterated by the *Tremella*, yet not a single ascophore of the *Nectria* could be found. Nevertheless there can be no doubt of the identity of the fungus.

256. HYPODERMA DESMAZIERI Duby, Hyster. p. 42, pl. 2, f. 22. Sacc. Syll. ii. 786.

Perithecia amphigenous, but mostly epiphyllous, scattered in long rows, immersed, oval or elliptical, up to ½ mm. long (or rarely 1 mm.), convex, covered by the blackish striated epidermis, somewhat shining, lips rather swollen, closely appressed, leaving a scarcely discernible longitudinal fissure. Asci broadly clavate, somewhat attenuated towards the apex, sessile, 50–70 × 10–12 μ. Spores distichous, varying from elliptic-oblong through lanceolate to nearly linear, obtuse above, tapering slightly downwards, often cloudy or 2–5-guttulate, but sometimes quite hyaline, occasionally curved, 24–28 × 2–4 μ, at first surrounded by a broad perfectly hyaline mucous coat; paraphyses numerous, filiform, flexuose, 1–1½ μ broad, slightly longer than the asci, often curved and thickened at the apex.

On dead leaves of *Pinus Strobus*, Bagley Wood, Oxon., April (A. D. Cotton). Each perithecium is surrounded while young by a narrow dark grey area, which is bounded by a thin black line; afterwards the whole becomes black. A few globose colourless spermatia, 3–4 μ diam., were seen mingled with the asci. Though this account differs from that of Duby in some respects, there can be no doubt that the species is correct.

178. LACHNEA COPRINARIA var. MINIMA Gr.

Having since found better specimens of this, in a more mature state, I have to record that it now seems to me to be nothing but *Ascobolus barbatus* M. & C. in its early stages. This species is described as being intermediate between *Lachnea* and *Ascobolus*. The statement made in the *Transactions of the British Mycological Society*, vol. iv, p. 367, note, could not possibly be true.

CŒLOMYCETES.*

257. PHYLLOSTICTA CAMELLIÆ Westd. in Kickx, Flor. Crypt. i. 416. Sacc. Syll. iii. 25.

P. camelliæcola Brun. Misc. Mycol. p. 13. Sacc. Syll. x. 101.

Spots large, roundish or oblong, up to 25 mm. wide, whitish-grey, with a narrow thickened blood-red border, visible on both sides of the leaf. Pycnidia epiphyllous, immersed, globose, papillate, black, 150–300 μ diam., piercing and at length bursting the epidermis. Spores ovoid-oblong, biguttulate, 4–5 × 2–2½ μ.

On living leaves of *Camellia japonica*. Ward End Hall, near Birmingham, Dec. 1885.

It is obvious, on comparing the descriptions of the two supposed species with these specimens, that they are one and the same; large and small pycnidia occur on the same spot, closely intermixed.

258. PHYLLOSTICTA CORYLI Westd. Bull. Acad. Belg. xix. no. 1. Sacc. Syll. iii. 31.

Spots scattered over the leaf, rather large, fuscous-ochraceous, then dingy whitish. Pycnidia lens-shaped, 100–150 μ diam., pierced by a pore; texture smoky-yellow. Spores ellipsoid, rounded at both ends, biguttulate, 7–8 × 2–3 μ.

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* The descriptions of the Cœlomycetes (*i. e.* Sphæropsidales and Melanconiales) herein given are part of those prepared for a work on that group of British Fungi, now well advanced. See *Kew Bulletin*, 1917 and 1918.

On living leaves of *Corylus Avellana.* West Kilbride, Ayrshire (D. A. Boyd). July.

Accompanied on the same spots by *Labrella Coryli* Sacc., of which it seems to be an early stage, for all possible sizes and shapes of spores could be found between those of the *Phyllosticta* and the typical spores of the *Labrella.*

259. PHYLLOSTICTA ERICÆ Allesch. in Syd. Beitr. zur Kennt. Pilzfl. Brand. Hedwig. xxxvi. p. (178).

Pycnidia scattered, few on each leaf, epiphyllous, covered by the epidermis, then erumpent and subsuperficial, globose-depressed, black, 100–150 μ diam.; texture variable, sometimes *Phyllosticta*-like, sometimes thicker and darker. Spores oblong or shortly cylindrical, rounded at both ends, often biguttulate, 4–5 × 1½–2 μ, when older eguttulate, 7–10 × 2–2½ μ.

On dead leaves of *Erica Tetralix.* West Kilbride, Ayrshire (Boyd). Jan.

The dead leaves are reddish-brown. Sydow considered this fungus to be a dangerous parasite on *E. carnea* in a nursery in Berlin, gradually discolouring and killing the leaves. Mr. Boyd's specimens differ in having the pycnidia entirely epiphyllous, not mostly hypophyllous as Sydow describes them; the spores also are slightly different.

260. **Phyllosticta lychnidina**, sp. n.

Maculis amplis, marginalibus, 10–25 mm. diam., ochraceo-fuligineis, denique centro pallidioribus, vix marginatis. Pycnidiis amphigenis, copiosis, sparsis, rotundis, lenticularibus, innatis, nigrescentibus, 100–120 μ diam., epidermidem poro nonnihil transigentibus; contextu pallide fusco, circa porum obscuriore. Sporulis oblongis, utrinque rotundatis, 4–5 × 2 μ.

Hab. in foliis vivis *Lychnidis dioicæ*, West Kilbride, Ayrshire (Boyd), Jul.

The texture of the pycnidium is that of a true *Phyllosticta*, but the fungus is evidently not a more developed state of *Depazea Lychnidis* Fr., though it might be an early stage of *Ascochyta Lychnidis* Lasch, of which nothing is known.

261. PHYLLOSTICTA PLATANOIDIS Sacc. Syll. iii. 13.

Spots none or indistinct. Pycnidia hypophyllous, densely gregarious, collected here and there into groups, immersed, blackish, globose, 60–100 μ diam., pierced by a pore; texture thin and transparent, pale-brown. Spores rod-like, straight, cylindrical, 4–6 × ½–1 μ, rounded at each end, where there is usually an indistinct guttule, and for that reason appearing subconstricted in the middle.

On fading cotyledons of *Acer Pseudoplatanus.* West Kilbride, Ayrshire (Boyd). June. Accompanied by *Phleospora Aceris* Sacc., the two often occurring on the same spot. The spots, which are roundish and about 4–5 mm. broad, seem then to be those made by the *Phleospora*, the pustules of which are amphigenous, but the pycnidia of the *Phyllosticta* are entirely hypophyllous and occur for the most part in a dense border round the spots. I have specimens of *Phleospora Ulmi* Wallr. which are equally accompanied by a *Phyllosticta*.

Mr. Boyd's specimens have spores in all respects identical with those of the fungus which has been already recorded under no. 241 (Journ. Bot. 1916, p. 219) as *Leptothyrium Platanoidis* Pass., and in the Staffordshire specimens that was also accompanied by the *Phleospora*. Comparison of these with examples of the *Phyllosticta* received from Sydow show that they are all forms of the same fungus, although the pycnidia differ somewhat in texture; and it would seem therefore that, at least so far as the British specimens are concerned, the "*Leptothyrium*" is a state of the *Phyllosticta* with pycnidia less complete below, and that both may be genetically connected with the *Phleospora*. Possibly, also, they may be stages of a *Mycosphærella* like *M. latebrosa* (Cooke), for the beginnings of an ascophorous stage with perithecia deeply immersed were occasionally observed.

It was noticeable that most of the pycnidia had the pore situated just beneath a stoma; this habit can be observed in many others of the Sphæropsidales.

262. PHYLLOSTICTA PUNCTIFORMIS Allesch. vi. 129.

Phoma punctiformis Desm. in Ann. Sci. Nat. 1849, xi. 283. Sacc. Syll. iii. 145.

Pycnidia amphigenous, but chiefly epiphyllous, numerous, scattered, without any distinct spots, subglobose, papillate, covered by the epidermis, which is at length penetrated by the pierced ostiole, blackish-brown, 125–200 μ diam.; texture pale-brown, thin, darker round the pore. Spores narrow-oblong, 4–6 × 1½ μ, but variable.

On fading leaves of *Lychnis dioica*. Largs, Ayrshire (Boyd). Sept.

The pycnidia are visible to the naked eye as black dots spread pretty uniformly all over the leaf, and not only on the faded parts. The texture of the pycnidium supplies a real reason why this species should be placed in *Phyllosticta*, not the shallow futile reason alleged by Allescher.

263. PHOMA ANCEPS Sacc. Syll. iii. 120.
var. POLYGONI var. nov.

Pycnidiis gregariis v. in imo caule dense effusis, ca. 100 μ diam., lentiformibus, orbicularibus, nigris, sub epidermide nidulantibus, dein plus minusve erumpentibus; contextu molli parenchymatico fuligineo irregulari. Sporulis bacillaribus vel anguste oblongis, utrinque rotundatis, at basi subangustioribus, 2–4-guttulatis, 11–15 × 2–2½ μ, sed interdum usque 20 μ longis, sporophoris similibus, brevioribus et subangustioribus suffultis.

Hab. in caule *Polygoni cuspidati*, in Horto Botanico, Birmingham, Martio. Inter *P. ancipitem* et *P. bacillarem* Sacc. quasi media.

264. **Phoma santonensis** Sacc. et Syd. Syll. xiv. 868.

Pycnidia somewhat crowded, and then often embedded in a thin black stroma, but also often standing singly, subglobose, black, about 250 μ diam., the loosened epidermis becoming whitish above the minute projecting ostiole, at length erumpent at the apex. Spores oblong, eguttulate, rounded at the ends, 6–7 × 2 μ; sporophores not visible.

On dead twigs of *Ilex Aquifolium*, in company with *Camarosporium Ilicis* Oud. Quinton (Ws.). March.

265. **Phomopsis alnea** v. Höhn. Fragm. Mykol. no. 87, p. 33.

Phoma alnea Sacc. Syll. iii. 98.

Pycnidia scattered or gregarious, globose-depressed, covered, at length bursting the periderm by a short longitudinal slit, blackish, up to ⅓ mm. diam. Spores lanceolate-fusoid, acute at both ends, occasionally biguttulate, 7–10 × 2–3 μ; sporophores subulate, crowded, 15–20 × 1–1½ μ rising from a thick soft olivaceous-brown stratum. (Tab. 550, f. 4.)

On twigs of *Alnus glutinosa*. Cheshire; Chatsworth (Ellis). May, June. The pycnidium of *Diaporthe alnea* Fckl.

266. **Phomopsis corticis** Grove.

Phoma corticis Fckl. Symb. Myc. p. 378; Fung. Rhen. no. 1943! Sacc. Syll. iii. 76.

Macrophoma corticis Berl. et Vogl. Syll. Addit. p. 312. Sacc. Syll. x. 201.

? *Rhabdospora ramealis* Sacc. var. *crassiuscula* Berl. Pug. Fungh. Fior. p. 85. Sacc. Syll. x. 388.

Pycnidia oblong, immersed in the cortex, very convex, placed longitudinally, black, each surrounded by a deep black shining stain, up to ½ mm. long, covered by the epidermis, which is raised and whitish at the summit and at length burst by the thick ostiole. A-spores fusoid, 6–7 × 1½ μ; sporophores long, subulate, crowded, curvulous: B-spores (= *P. corticis* Fckl.) linear, straight or bent, subobtuse at the ends, 20–25 × 1–1½ μ, on shorter sporophores.

On dead stems of *Rubus*, Meols, Cheshire (Ellis)! March, 1915. On living branches of *Rubus fruticosus*, Germany (Fuckel)! ? On dead branches of the same, Italy (Berlese), *n. v.*

The pycnidia are often incomplete in the way usual to a *Phomopsis*; sometimes a few of them are included in an area which is bordered by the narrow black line significant of a *Diaporthe*. The Cheshire specimens yielded only the A-spores, but the pycnidia of Fuckel's specimens are exactly identical in size, shape, and arrangement, though they are younger and on living stems: they have the true *Phomopsis* character and (though it is not certain) there can be little doubt that they represent the B-spores of the same species. Fuckel is wrong in giving the width of his spores as 3 μ; on examination of his exsiccatum it is seen that they seldom reach even 2 μ, and none of them were ever seen to be guttulate, as he describes. It is incorrect to unite them with *Septoria ramealis* Rob. et Desm. Crypt. Fr. no. 2189! (Ann. Sci. Nat. 1853, xx. 94), though the spores are very similar. Desmazières' species is seated on pale bordered spots (wanting in the *Phomopsis*), and is a true *Septoria*, not a *Rhabdospora* as Saccardo places it in Syll. iii. 580. It has a complete thin-walled plectenchymatous pycnidium; the spores are cylindrical, straight or curved, finely guttulate and at length pseudo-triseptate, 20–27 × 1½–2 μ. But what Berlese calls the var. *crassiuscula* seems from the description more likely to be identical with Fuckel's species, though this is mere surmise; in that case both *R. ramealis* and its variety have been wrongly placed.

267. PHOMOPSIS ERES Grove.

Phoma Eres Sacc. Mich. i. 521; Syll. i. 631.

Pycnidia scattered, conico-convex, 250–300 μ diam., blackish, covered by the periderm and only after a long time erumpent by a pore. A-spores elliptic-fusoid, acute at both ends, biguttulate, 9–10 × 2¾–3 μ; sporophores linear, straight, simple, crowded, 18–20 × 2 μ; mixed with them a few B-spores, 25–30 × 1 μ.

On dead twigs of Elm. West Kilbride, Ayrshire (Boyd). Dec. Cooke's specimens under this head are incorrectly named.

This is a very typical *Phomopsis*, the pycnidial wall being of the usual imperfect character. The young pycnidia, situated in the cortex, are surrounded by a white zone of densely felted mycelium, composed of much-branched hyphæ. There is, in some cases, a thin black line deeply penetrating the wood below the fungus: this is probably the beginning of the *Diaporthe*-stage. There cannot be the slightest doubt that this is the true species of Saccardo; Nitschke, who saw the B-spores, described them as curved, 33 × 1 μ, and recognised them as a pycnidial stage of his *Diaporthe Eres* (Pyr. Germ. p. 245), but he observed that they always appeared in different pycnidia from the A-spores. Whether *Phoma oblonga* Desm. is really the same as the latter, as Saccardo suggests, is not certain.

268. PHOMOPSIS PUSTULATA Grove.

Phoma pustulata Sacc. Syll. iii. 91.

Pycnidia rather scattered, long covered by the periderm, pustular, convex, ½–1 mm. diam., roundish, seated on the wood, at length erumpent at the summit. A-spores oblong-fusoid, pluriguttulate, somewhat obtuse at the apex, 10–14 × 2½–3½ μ; sporophores acicular, colourless, about as long as the spore: B-spores numerous, filiform, curved or hooked, 15–20 × 1–1½ μ, mixed with the A-spores.

On dead branchlets of *Acer Pseudoplatanus*. Stewarton, Ayrshire (Boyd). Dec.

The pycnidium of *Diaporthe* (*Chorostate*) *pustulata* Sacc., which occurred with it on the same branchlets. As usual with the pycnidia of the subgenus *Chorostate*, the A-spores incline towards *Fusicoccum*. The perithecia were in groups of 4–12, erumpent by a slit; each had a rather thick slightly protruding papillate and umbilicate ostiole, and otherwise agreed exactly with Saccardo's description of *D. pustulata*; the groups were surrounded by a black line which penetrated the wood. The ascospores closely resembled the A-spores, but were larger, constantly 4-guttulate, and slightly constricted at the septum.

269. PHOMOPSIS SUBORDINARIA Trav.

A large quantity of this was gathered on *Plantago lanceolata* at Earlswood Lakes station, in October last year. In these specimens the B-spores far outnumbered the A-spores which occurred in the same pycnidia; they were of the usual character, straight, curved, flexuous, bent, or hooked, about 20–23 × $\frac{3}{4}$–1 μ. This makes another species in which both kinds of spores have been found; the list of such, given in the *Kew Bulletin*, 1917, p. 50, must now be increased by the following:—

Phomopsis corticis.
,, *Eres.*
,, *pustulata.*
,, *quercella.*
,, *subordinaria.*

Moreover in that article, p. 66, it was stated that the phenomena described by Diedicke, due to the parasitic habit of this species, had not been observed in Britain. Hardly were these words in print when they became untrue: the exact course of events described by him was seen for the first time in two places near Birmingham. The curved peduncle with its drooping spike was very noticeable, and has since been met with as early as June; the pycnidia are to be seen on the curved part while the spike and the lower part of the peduncle are still fresh and vigorous. Evidently one of those things to be found easily when one knows what to look for. The following species of *Phomopsis* may now be regarded as parasitic:—

P. abietina, on *Pinus*, etc. (see no. 271).
P. aucubicola, on *Aucuba.*
P. corticis, on *Rubus.*
P. Stewartii, on *Cosmos.*
P. subordinaria, on *Plantago.*

270. PHOMOPSIS VEPRIS v. Höhn. Fragm. Mykol. no. 87, p. 33.
Phoma vepris Sacc. Syll. iii. 76.

Pycnidia gregarious, small, round, immersed, globose-depressed, blackish, about 200 μ diam., at length just piercing the epidermis. Spores fusoid, 5–7 × 1–1½ μ; sporophores crowded, linear, erect, hardly longer than the spore, rising from a yellowish fertile stratum.

On dead stems of *Rubus*, Eastham Rake, Cheshire (Ellis). The pycnidial stage of *Diaporthe vepris* Fckl. et Nits. The pycnidia here also are incomplete, but do not resemble those of *P. corticis*, so that it seems possible that the two species are different in spite of their similarity; the sporophores especially are different. The British specimens in Herb. Kew under this name do not belong to *Phomopsis* (see *Kew Bulletin*, 1917, p. 71), but Dr. Ellis's certainly are correct.

SCLEROPHOMA Died.

A genus resembling *Phoma* in most respects, but it is without an ostiole and the lower part of the pycnidium is filled with a well-developed stroma, consisting of cells similar to those which form the mass of a sclerotium. There are no sporophores, the spores are seated directly on the stroma; this at length resolves itself into a mucilage in which the spores remain embedded.

It seems likely that several species now classed with *Phoma*, such as *P. enteroleuca* Sacc., will turn out on investigation to belong to this genus. The stroma here is not external to the pycnidium, as misconceived by Stevens.

271. SCLEROPHOMA PITHYA Died. Pilz. Brand. ix. 280 (? *non* v. Höhn. Fragm. Mykol. 1909, no. 402).

Phoma pithya Sacc. Mich. i. 126; Syll. iii. 73.

Phoma Cembræ Karst. Fragm. xxii. p. 2.

? *Phomopsis pithya* Lind, Dan. Fung. 1913, p. 421 = *Phoma abietina* Hartig (1888) = *Fusicoccum abietinum* Prill. & Delacr.

Sporonema strobilinum var. *ramulorum* Vesterg. Oefv. K. Vet. Ak. Förh. 1897, p. 45. Sacc. Syll. xiv. 1000.

Pycnidia scattered or irregularly gregarious, covered by the bark, then semi-erumpent, globose, not papillate but rounded above and mouthless, 300–500 μ diam., at length nearly superficial; contents whitish; texture thick, rather solid, parenchymatous, smoky-brown. Spores at first obovoid, 6–7 × 2–2½ μ, then obovate-fusoid, 7–9 × 2½–3 μ, at length distinctly fusoid, acute at one or both ends, 9–12 × 3–4 μ (or even 5 μ), sometimes guttulate, generally straight but sometimes inequilateral, seated directly on a dense mass of nearly colourless cells that ultimately become reduced to a mucus, which is often faintly tinged with brown and in which the spores are embedded; no definite sporophores. (Tab. 550. f. 3.)

On small dead branches of *Pinus silvestris*, King's Lynn (Plowright); Cheshire (Ellis). On the same, Edgbaston Botanic Gardens, Birmingham. Mar.–Apr. Plowright's specimens were sent to me so long ago as 1881, mixed with *Cenangium Abietis* Rehm, but remained unnoticed till this year.

Said to be the pycnidial stage of *Diaporthe pithya* Sacc., this species has been placed in *Phomopsis*, to which our specimens certainly cannot belong on account of the entire absence of the remarkable persistent sporophores which are characteristic of that genus. For the spores are seated on a mass of cells of a subsclerotioid nature, in this respect resembling *Plenodomus*, but in the latter the sclerotioid cells do not resolve themselves into mucus, as they do in *Sclerophoma*.

Phoma Cembræ Karst. is undoubtedly the young state of the *Sclerophoma*, before the spores assume the fusoid form, and *Phoma pithya* Sacc. is the more advanced state. *Phomopsis pithya* Lind, with its synonyms, cannot be the same fungus, as asserted by Lind; the species classed under those names has long sporophores and is a true parasite, doing great harm to numerous Conifers (*Abies*, *Juniperus*, *Picea*, *Pinus*, *Pseudotsuga*), but the *Sclerophoma*, so far as at present known, appears to be only saprophytic. *Phomopsis pithya* Lind should be called *Phomopsis abietina* (Hartig).

Sporonema strobilinum Desm. has very similar spores (Tab. 550. f. 8), but they are borne on long subulate or filiform often branched sporophores, and the upper part of the pycnidium at last falls away, leaving a naked disc. Its variety *ramulorum* Vesterg., however, is certainly a form of the *Sclerophoma*, since its habitat is on dead branches of Pine, and its sporophores are expressly described as obsolete, and the texture assigned to the pycnidium is that of *Sclerophoma*. There are thus two similar but distinct Fungi occurring on Pine—a *Sclerophoma* and a *Sporonema*, and in all probability a third species, a *Phomopsis* or a *Fusicoccum*, similar at first sight, but differing in essential characters.

272. DOTHIORELLA FRAXINEA Sacc. & Roum. Rel. Lib. iv. 90, f. 43. Sacc. Syll. iii. 236.

Pycnidia subglobose, clustered, erumpent, subconfluent, the mass often flattish or convex or mamillate with the indistinct ostioles, black, up to ½ mm. diam., closely surrounded by the fragments of the bark; contents whitish. Spores oblong-elliptic or subclavate, sometimes inequilateral, frequently tapering at the ends, $8–10 \times 2–2\frac{1}{2}\ \mu$ ($12 \times 5\ \mu$, Sacc.), rarely with an indistinct guttule; sporophores not seen.

On bark of Ash. Lichfield. Feb., 1887.

The spores differ, but this is probably merely a state of Saccardo's species. Externally it exactly resembles *Botryodiplodia Fraxini*, of which it is the early stage, standing to it in the same relation in which *Dothiorella pyrenophora* stands to *Botryodiplodia pyrenophora*. This relation seems to be parallel to that which the species of *Microdiplodia* hold to those of *Diplodia* on the same hosts.

273. **Cytospora Myrtilli**, sp. n.

Conceptaculis sparsis, minutis, tectis, dein ostiolo vel disco erumpentibus, nigrescentibus, 1–5 in stromate atro-cinereo usque 600 μ diam. congregatis, nucleo albo, disco minuto, pruinoso, cinereo-albido, ostiolis atris, sæpius non proëminentibus, pertuso. Sporulis allantoideis, curvulis, $4–4\frac{1}{2} \times \frac{3}{4}–1\ \mu$, sporophoris confertis, plerumque simplicibus, rectis, $30–40 \times 1\ \mu$ suffultis.

Hab. in ramulis emortuis *Vaccinii Myrtilli*, West Kilbride, Ayrshire (Boyd), Mart. 1918.

The slightly convex pustules of the cinereous stroma show dark through the epidermis, which is at length pierced at the centre, it may be by a simple blackish ostiole, it may be by a whitish pruinose disc in which lie 1–5 pierced round ostioles.

(To be continued.)

JOSEPH ANDREWS AND HIS HERBARIUM.

(Continued from p. 261.)

II. The Herbarium.

By G. S. Boulger, F.L.S.

Andrews's herbarium consists of ten fascicles, the first seven now in Linnæan order, the eighth apparently unarranged, the ninth consisting of Pteridophytes, and the tenth of Cellular Cryptogams. This last contains the series of "Curious sea Plants taken between

Yarmouth & Lyn by William Paine Botanist in January 173$\frac{8}{9}$” mentioned in this Journal for 1904 (p. 299); and the second fascicle includes the entire-leaved variety of *Lamium purpureum* L., for which the varietal name *Andrewsiana* was proposed (Journ. Bot. 1908, 194).

A large number of plants bear dated labels which are earlier than the first printed records in Hinds's *Flora of Suffolk*; a few similarly antedate Gibson's *Flora of Essex* (1862): in these cases an asterisk is prefixed to the locality. Others are of interest because sent by Dale, mentioned by Dillenius, or for some other reason. In the following enumeration I have mostly retained the names on the labels and have added modern names; the vascular plants are arranged according to the British Museum *List of British Seed-Plants and Ferns* (1907). The modern name is given first and any other comment added by me is in square brackets. The plants of Dale's herbarium, to which reference is frequently made, are incorporated with the British Collection in the National Herbarium.

Thalictrum flavum L. *Priory meadows, Sudbury, July 1740.

Myosurus minimus L. *In a field adjoining Highams Wood, Cornard, May 1, 1745 plentifully.

Ranunculus (*Batrachium*) sp. *R. aquatilis* Ger. em. 829. R. S. 3. 249 3.

R. circinatus Sibth. *R. aquaticus albus circina* tis tenuissime divisis foliis, floribus et alis longis pediculis innixis. D. Plukenet Alm. 311. t. 55 f. 2. R. S. 3. 249. 5.

R. fluitans Lam. *Ranunculo sive Polyanthemo aquatile albo affine Millefolium maratriphyllum fluitans.* R. S. 3. 250. 6.

R. sceleratus L. *Ranunculus palustris rotundifolius* Ger. emac. 962. R. Syn. 3. 249. 1.

R. acris L. (An *Ranunculus rectus non Repens flore pleno* J. B. 3. p. 416. *Ranunculus pratensis erectus acris* R. S. 3. 248. 1.) I gathered it in my garden from a root found in a pasture in Sedmarsh, Essex, 1750.

R. parviflorus L. *By the roadside between Great Cornard Church and the Meer. May 20, 1743.

Berberis vulgaris L. *Berberis dumetorum* C. B. Pin. 454. R. S. 3. 465. *Pipperidge.* *Clare Castle, 27 Aug. 1745.

Nymphæa alba L. Cornard Mere.

Papaver Lecoqii Lamotte. *Papaver laciniato folio, capitulo longiore glabro seu Argemone* capitulo longiore glabro R. Syn. 3. 309. *Bulmer [Essex], June 11, 1744.

P. somniferum L. On Hedingham Castle. I gathered in June 2, 1722. On a bank by the roadside on Land Beach Common by Denne Abby (as I road from Cambridge to Stretham ferry) where it grows in great plenty for a mile or two in length. [Babington says (Fl. Cambridgesh. 12–3) “Said to have been formerly largely cultivated in the Fens, where it sometimes comes up when the banks are deeply turned over. On the banks of the closes which separate Denny Abbey from the Ely road.”]

Corydalis claviculata DC. *Assington [Suff.], June 10, 1748 and July 15, 1745.

Radicula Nasturtium-aquaticum Britt. & Rend. *Cornard Mere and King's Marsh. [Suff.]

Barbarea verna Aschers. *Barbarea foliis minoribus & frequentius sinuatis* R. S. iii. 297. *Ballingdon Lime Kiln-yard [Essex], May 13, 1745.

Arabis scabra Allioni. *Turritis minor foliosa* Pet. H. B. 48. 2. R. Syn. iii. 294. 4. Abundantly on a stone wall between Bath and Wells, May 31, 1731, Somersetshire. [One of Dale's tickets.]

A. glabra Bernhardi. Ballingdon, June 16, 1746.

Cardamine hirsuta L. Watery lane between Averston [Alphanstone] Church and Lamash Street, Essex, May 8, 1746. [Apparently not recorded for Essex before Gibson's *Flora* (1862).]

C. amara L. [Same place and date. Recorded from Braintree by Ray, Cat. Pl. Angl. (1670), 220.]

Hesperis matronalis L. Brockly Green, from Hartoft. April 27, 1744.

Erysimum cheiranthoides L. From the late Mr. Will. Holman, Norwhich [sic].

Brassica campestris L. β. Rapa. From Mr. Richard Cook of Halstead, Essex. May 30, 1750. [No doubt a mere escape.]

Camelina sativa Fries. Near Bornum in Suffolk. [This species, probably repeatedly introduced with flax seed from Russia, occurs not uncommonly in Essex fields.]

Thlaspi arvense L. In some fields by Assington Street, Suffolk and in *Wisborough Hill, Gestingthorp [Essex] and in Cornard Mere, 1745.

Hutchinsia petræa Ait. *Nasturtiolum montanum annuum tenuissime divisum* D. Bobert. R. Syn. iii. 304. On the wall by the sheep walk at Bristol abundantly where I gathered the seeds, May 26, 1731. But lost them in the fire at Blandford, June 4 following. [This is Dale's ticket. See Journ. Bot. 1883, p. 228.]

Teesdalea nudicaulis Ait. In sandy fields by the Dovehouse Heney, and by the Moors, Assington [Suff.] and in a field called old field by Brake hill Bulmur [Essex] and elsewhere.

Lepidium campestre Ait. By Wormingford Church, Essex, June 21, 1743, and Cornard [Suff.].

L. ruderale L. *Thlaspi minus* Ger. 204. Ger. emac. 262. R. S. 3, p. 303. In the yard, Sudbury, July 28, 1762, where the coals lye. [This is the last dated entry in the herbarium. Hind gives "Dillenius, 1724" as the earliest Suffolk record; but this I am unable to trace. The earliest Essex record is Ray, Cat. Pl. Angl. (1670) 296, for Maldon. Hill writes under the name "Narrow leaved Cress. Nasturtium sylvestre Osyridis folio C. Bauhin," "common by road-sides in Essex" (Brit. Herbal (1756), 268.]

Cakile maritima Scopoli. *Eruca marina* Ger. emac. Yarmouth in Norfolk and between the Town and the Cliff at Harwich. [Recorded from Canvey Island by Blackstone in 1746 and figured in *English Botany* from a Southend specimen sent by Edward Forster in 1794.]

Reseda lutea L. *Ballingdon limekiln [Essex], 6 July, 1744.

Helianthemum Chamæcistus Miller. *Ballingdon Hills [Essex], June 10, 1743. Flore luteo et fl. albo.

Polygala vulgaris L. *On the Boggs at foot of Link hills, Maplestead [Essex], May 27, 1746.

Frankenia lævis L. In Landguard Fort yard and in Mersey Island. [In Dale's Herbarium is a specimen from Mersea dated 1732.]

Dianthus Armeria L. *Ballingdon [Essex], July 11, 1746.

D. Caryophyllus L. Priory Courtyard, Sudbury, July 29, 1745, and on a wall at Leverington nr. Wisbeach. [This Cambridgeshire locality is recorded by Relhan and Babington.]

D. deltoides L. Peckham field in Southwark [Surrey], 1711.

Silene anglica L. *Cornard & Chilton, July, 1738, and Little Chapple field, Ballingdon. [Hind's first record is "Sir J. Cullum, 1773." It is recorded from Colchester in Parkinson's *Theatrum* (1640), p. 640, and from Essex, on Dale's authority, in R. Syn. as *Lychnis sylvestris flore albo minimo* Hist. nost. II. p. 995. The specimen in Dale's herbarium is from "Maplestead Magna, between Halstead and Hedingham Sible."]

S. Otites Wibel. *Lychnis viscosa flore muscosa* R. S. 3. 340. 15. Spanish Campion. I found it going up the Hill from Tudnum [Tuddenham] towards Barton Mills and afterwards beyond Barton Mills up the hill where the *Abrotanum campestre* [*Artemisia campestris* L.] grows. [This locality was one of Willisel's, but is recorded by a Mr. Sare in How's *Phytologia* (1650), 86, and by Churchill Babington in Hind's Flora.]

S. amœna Huds. Yarmouth, Norf. and Mersey I., Essex [n. d.].

Sagina nodosa Fenzl. *Alsine palustris foliis tenuissimis seu Saxifraga palustris Anglica* R. S. 3. 350. *Cornard mere. 26 Aug. 1746.

Minuartia tenuifolia Hiern. *Ballingdon [Essex] and Friar's Cause wall, Sudbury, 1721.

Stellaria graminea L. *Alsine longifolia uliginosis proveniens locis* R. S. 3. 347. *In the sandy lane by Stebings Bulmur.

Myosoton aquaticum Mœnch. *Alsine major repens perennis* J. B. R. S. 347. 4. Brundon Hall.

Cerastium viscosum L. *An 3 Alsine hirsuta Myosotis latifolia præcocior* R. S. 3. 348. *Kittindon hills [Suff.], April, 1745.

C. vulgatum L. [Under the same name.] Boggy ground at Cornard Mere and Kittindon hills.

C. semidecandrum L. *Cerastium hirsutum minus parvo flore* R. S. 3. 348. *Great Cornard Churchyard, April 20, 1744, and *Ballingdon Hall.

C. arvense L. *Caryophyllus holosteus arvensis fl. majore* C. B. R. S. 3. 348. 1. Between Gogmagog and Haverhill.

Alsine rubra Crantz. *Spergula purpurea* R. S. 3. 351. *In the Broomfield ride through from the Hole farm to the Hill. June 11, 1745.

A. MARGINATA L. H. G. Reichenbach. *Alsine spergula facie media* R. S. 3. 351. *Mersey Island.

SCLERANTHUS PERENNIS L. *Knawel incanum flore majore perenne* R. S. 3. 160. 2. Sandy ground by Thetford, Norfolk. June.

MONTIA FONTANA L. *In a field of rye near Sheepcoat in Henny [Essex]. April 25, 1745.

MALVA MOSCHATA L. Wormingford Mill [Essex]. June 21, 1743.

TILIA PLATYPHYLLOS Scop. R. S. 3. 473. 3.

T. EUROPÆA L. INTERMEDIA DC. R. S. 3. 473. 1. Bulmur vicarage. July 13, 1744. [Recorded for Essex by Turner, Herbal, ii. 153; but probably not native. See Ray, Hist. Pl. ii, 1694.]

T. CORDATA Miller R. S. 3. 473. 2. Brunden Wood. July 25, 1744. [Possibly indigenous in North Essex.]

HYPERICUM HUMIFUSUM L. Babery Heath. June 14, 1745.

H. PULCHRUM L. *Cornard. July 9, 1744.

H. ELODES L. Between Norwich and Yarmouth, Aug. 1725, and Gamlingay sinks, Cambridgeshire. [The latter bog was drained in 1843: Fl. Cambridge, 44.]

GERANIUM PRATENSE L. *Bulmur and Water Belchamp plentifully. [Essex.]

G. SANGUINEUM L. In the Devil's Ditch and on the banks beyond Stetchworth Gap. 1711.

G. MOLLE L. fl. albo. Roadside between Sudbury and Bures. June 3, 1754.

G. PUSILLUM L. *Ballingdon. May 18, 1743. [There is no Essex record prior to Gibson's *Flora*, 1862.]

ERODIUM CICUTARIUM L'Hérit. *Great Cornard. July 2, 1745.

LINUM PERENNE L. Gogmagog Hills.

RADIOLA LINOIDES Roth. *I gathered it in Sept. 1711 going up the hill fr. Barton Mills to the place where the *Abrotanum campestre* grows. [See under *Silene Otites*.]

RHAMNUS CATHARTICUS L. *solutivus* Ger. em. 1337. Park. 243. R. S. 3. 466. *Gallow Hill, Suffolk.

R. FRANGULA L. *Alnus nigra baccifera* R. S. 3. 465. *Colledge Wood, Middleton [Essex]. Aug. 15, 1745.

ULEX MINOR Roth. R. S. 3. 475. 2. Heath near Northampton. Michaelmas, 1745.

GENISTA ANGLICA L. *Genista minor Aspalathoides* R. S. 3. 475. *Cornard Heath plentifully. May 23, 1754.

ONONIS REPENS L. β. *maritima* Dum. Yarmouth between town and fort. Aug. 1725. [This form, *Anonis procumbens maritima nostras foliis hirsutie pubescentibus*, is recorded from Yarmouth by J. Sherard, R. Syn. 3. 332.]

MEDICAGO FALCATA L. In the Windmill Pitt. [? Sudbury.]

M. ARABICA Huds. *St. Gregory's Croft [Suff.] opposite to the Papping House. June 15, 1745.

(To be continued.)

SHORT NOTES.

HAYBEECH AND HORNBEAM. The late Dr. John Nisbet writes (*British Forest Trees*, p. 272 (1893)) :—"The Hornbeam is described as being indigenous from the south-west of France eastwards across central and eastern Europe to Persia, northwards to England and Ireland (but not Scotland) and the southern portion of Sweden, and southwards to lower Italy and Greece. The evidence of historical records goes, however, to prove that it was not originally among the forest trees of England, but was introduced from the Continent before the close of the fifteenth century." Few British botanists will, I think, doubt the indigenous character of the tree. Even Mr. Dunn, who is generally prone to class plants as aliens, says (*Alien Flora of Britain*, p. 173) :—"A native of the south-eastern counties of England, and perhaps in a few places further north and west, but far more common in England, Scotland, and Wales as a planted tree"; while Messrs. Elwes and Henry seem to accept—as did Hooker in the *Student's Flora*—the evidence accumulated by Hewett Watson, and to consider it as truly wild from Kent and Dorset to Stafford and Norfolk—a distribution quite in keeping with that on the Continent. As Trimen and Dyer say (*Flora of Middlesex*, p. 265), Hornbeam "formed a large, perhaps the chief part of the ancient forest on the clay north of London, of which Enfield Chase was the remains; it is still the chief tree in many parts of Epping Forest"; and I have seen the tree growing with every appearance of wildness over most of the area just stated. It is true that we have no earlier mention of it in English botanical literature than Gerard's *Herball* (1597), p. 1296, where he says "the Hornbeame tree grows plentifully in Northamptonshire, also in Kent by Gravesend, where it is commonly taken for a kind of Elme"; and I know of no early reference to it in general English literature, though, perhaps, the well-known fact that the tree is in all countries confused by the unscientific with others, beech, elm or hazel, is a sufficient explanation of the absence of such allusions. I have, however, just come across a piece of folk-lore which affords, I think, some valuable evidence. In S. Graveson's *The Chalfont Country* (Homeland Association, 1904), the Rev. W. H. Summers in an Introduction (p. 13) writes :—"On the eastern side [of the Chilterns] the Hornbeam, locally called 'haybeech' is plentiful, as in the adjoining county of Hertford." That this name was still well-known as applicable to the Hornbeam I confirmed by enquiry from the first hedger and ditcher I met in the neighbourhood of the Chalfonts; but was surprised to find that the only reference to it in Britten and Holland's *Dictionary of English Plant Names* (p. 246) was "A variety of *Fagus sylvatica* L.—'There are some trees in our woods with a rougher bark, which the woodmen call Hay Beech.' *Mart. Mill.*" I believe this "rough-barked beech" to be merely the hearsay repetition of some unscientific person's observation of the Hornbeam; but the present interest is the name. It is, of course, not unlike the German *hainbuche*, the thicket beech; but *hay*—in combination in English words seems always to be the old English *haga*, hedge, as in *Haymaiden* and *Hedgemaiden*, both names for

Nepeta Glechoma Benth.; *Haythorn,* which Britten and Holland give for *Hawthorn*; and *Hayriff* for *Galium Aparine* L. Such a name is hardly likely to have been acquired by a plant in England after the Norman conquest or anywhere near "the close of the fifteenth century."—G. S. BOULGER.

LATHYRUS ARMITAGEANUS and OXALIS DARVALLIANA. In *Index Kewensis* these plants stand respectively as

"*Lathyrus Armitageanus* Knowles & Westc. Fl. Cabinet, iii. '(1840') [1839] 81=nervosus."

"Oxalis Darvalliana Knowles & Westc. iii. 1840. 5."

In this Journal for 1901 (p. 97) I pointed out that the former was published at an earlier date and suggested that Westcott was the authority for the species: it may be worth while to set the matter beyond doubt, and to show that the *Oxalis* also rests on the same authority, It appears from notes in Loudon's *Gardener's Magazine* (ix. 525 & 526; 1835) that both plants were published by Frederick Westcott—Loudon's mistake as to the meaning of "West." was corrected by David Cameron (*op. cit.* 689)—in Aris's *Birmingham Gazette* for May 18, 1835: they were grown in the garden of the Birmingham Botanical and Horticultural Society, of which Westcott was a secretary, and commemorated "the late lamented Secretary, Dr. Darwall, and the Treasurer, the late Mr. [James] Armitage, both of whom were devotedly attached to the science of Botany, and with whom the Society may be said to have originated." The newspaper notices, of course, cannot be regarded as publication; but Loudon (*l. c.*) adapts and amplifies the descriptions, which may date from the *Magazine.* The reduction of *L. Armitageanus* is doubtless accurate; the *Oxalis,* for which no equivalent is given in Ind. Kew., may, I think, be referred without doubt to *O. versicolor* L., of which it was originally considered a variety. The date "1840" is inaccurate—the numbers of the *Floral Cabinet* are dated: the history of the two species may be stated as follows:

Lathyrus Armitageanus Westcott ex Loud. Gard. Mag. ix. 325 (1835); ex Maund, Bot. Cab. vi. n. 525 (1836); Fl. Cab. iii. 81, t. 110 (Aug. 1839) = L. nervosus Lam.

Oxalis Darvalliana Westcott ex Loud. l. c., p. 325; Fl. Cab. iii. 5, t. 93 (March, 1839) = O. versicolor L.

JAMES BRITTEN.

CALAMINTHA ACINOS Clairv. In this Journal for 1915. p. 217 I suggested tentatively that *C. Acinos* Clairv. and *C. arvensis* Lamk, are different species, basing my opinion upon a series of plants of *C. Acinos* from limestone rocks in the Bristol and N. Somerset district, and upon a series of *C. arvensis* from different parts of the Continent and from Surrey. The matter is still under investigation, but I may already add that although the smaller annual plant of arable fields and dry rubbly places has long been known in parts of Somerset, I had never seen that form in this county until August 12 this year. When cycling from my work on the ridge between Clevedon and Clifton I noticed a specimen on the edge of the road at the top of Tickenham Hill at about 500 feet. A field of oats adjoining was being cut, and a week later I found quantities of the plant (associated with *Prunella*, *Arenaria serpyllifolia*, etc.) in the near corner of the field. Examination of specimens confirms my opinion that this annual late-flowering plant is different from the larger and more shrubby Calamint of limestone rocks about Clifton, where this year it began to bloom the first week in May and has long since withered up. As early as March 16th I gathered and dried good foliage specimens with erect woody spikes of last year's flowering stems, clearly showing the plant is not annual at Clifton Down. On April 18th I sent a rooted specimen or two from Bristol to the late Mr. Hunnybun, of which he fortunately made a drawing a week or two later. Part of one of these specimens I dried because of its large leaves, some of which are 13 mm. wide, though the plant was exceptionally leafy. However, a point of distinction not hitherto mentioned is that the leaves of *C. arvensis* are usually distinctly smaller and narrower than those of the Bristol plant. The larger size of the corolla and leaves of *C. Acinos* brings it very near to *C. alpina*, a somewhat variable species with more purple (*i. e.* less blue) flowers. Schinz and Keller, who place all the Swiss and British Calamints in *Satureia*, mention that in *Acinos* the calyx-teeth are connivent and close the entrance after fertilization, whereas in *alpina* the calyx remains open.—H. S. Thompson.

Euonymus europæus L. It was Scopoli who divided *Euonymus europæus* of Linné into two distinct species—*E. latifolius* Scop. and *E. vulgaris* Scop. Although *E. latifolius* is sometimes seen in shrubberies and gardens, I am not aware that it has been noted in the "wild" state in Britain. In August I saw two bushes of it under Scots Pine and Oak in a wood I was valuing on Tickenham Hill, N. Somerset. The keeper thinks it was not introduced by man; but it may owe its origin there to birds. It differs from the common Spindle-tree in its larger and broader leaves (the largest are 5 × 2½ inches) which are markedly veined beneath; by its purplish flowers, 5–10 in a cyme, rounder petals; and by its larger and flatter and much winged capsules, which already by August 5th had seeds enveloped in a similar beautiful orange-coloured arillus to that of the common Spindle-tree. In this wood and some neighbouring ones the common Spindle-tree is abundant; and I have observed that whereas the young branches of a third to half an inch diameter are remarkably quadrangular and ridged, they become round when a little older, and are always round when *quite* young and small. The shoots of *E. latifolius* are, I believe, never square. Marshall Ward pointed out (*Trees*, i. 94) that the Spindle-tree is one of very few trees, shrubs, or other woody plants in which "we find the true epidermis persist beyond a few months on the twigs," without "the formation of corky or other coverings on the older twigs, branches and stems."—H. S. Thompson.

REVIEW.

Medicinal Herbs and Poisonous Plants. By David Ellis, D.Sc., Ph.D., F.R.S.E. Fcap 8vo, pp. xi, 179; 103 illustrations. Blackie & Son. 2*s.* 6*d.* net.

In this attractive little volume, Dr. David Ellis, of the Royal Technical College, Glasgow, has given us a simple account, both from the botanical and economic points of view, of the principal native and cultivated plants used in medicine. He devotes two chapters to floral structure and physiology, basing the former upon familiar types and under the latter head discussing the various products: these are followed by chapters in which the plants are systematically arranged and their properties described. Special instruction is given as to collecting for medicinal purposes—a subject of much importance at the present time: occasionally hints of practical importance are given, as when the growing of Mustard is referred to: "most of our supplies came from the Continent, indicating that we had not attended sufficiently to the cultivation." Some of the more important species are described at length, and the characteristics of others are given: we think that this feature might be extended at the expense of information which is of little value: *e. g.* a fuller description of *Coriandrum* (p. 93)—of which we are only told that it has white flowers, no reference being made to the curiously unpleasant odour of the whole plant—might usefully replace the unnecessary warning on the preceding page that *Carum Carvi* "must not be confused with" *C. verticillatum* and *C. Bulbocastanum.*

Here and there are statements to which we should demur—*e. g.* that *Cicuta virosa* is "superficially not unlike Hemlock" (p. 83). The *Pedicularis* of pastures is not *sylvatica* but *palustris*, and we should not regard *Melampyrum pratense* as a "pasture plant" (pp. 102, 103): folk see colour so differently that perhaps *Colchicum* may appear "rose-coloured" to some (p. 21). The general cultivation of *Chenopodium Bonus-Henricus* in Lincolnshire might have been mentioned. We are surprised to find no reference to *Hypericum*, from at least two species of which a healing ointment is made in country districts, nor are the consolidating properties of Comfrey indicated: it seems likely that popular rustic remedies would repay investigation. Occasionally we meet with a somewhat puzzling statement, such as that "many cases of poisoning have occurred from the leaves [of Foxglove] being eaten in mistake for the leaves of other plants—*e. g.* the Borage" (p. 97); do people eat Borage leaves?

The book is admirably printed, though we think black type might with advantage have been more extensively employed, and is singularly free from misprints: we note "*Patienta*" (p. 47) and "*S*celeratus" and "*S*coparius" (the former thrice). A useful appendix gives lists of herbs of which leaves, flowers, seeds, and roots are wanted, and which "from considerations either of patriotism or profit should be grown in this country"; and there is a good index.

The numerous illustrations, which Dr. Ellis, who, with his wife, is responsible for them, modestly (and indeed incorrectly) calls "diagrams," demand a special word of praise; all are good and some—*e. g.* the Coltsfoot (p. 143)—are excellent.

BOOK-NOTES, NEWS, ETC.

Clarence Bicknell, whose death occurred at his mountain residence in Italy on July 17, was born in 1842 in a beautiful house at Herne Hill, then a charming neighbourhood: his father, Elhanan Bicknell, was a wealthy city merchant and a friend and patron of Turner. From a very early age Clarence had a great love of flowers, which he collected and painted. Educated at private schools, he went to Trinity College, Cambridge, where he graduated M.A.: later he took Orders in the Church of England, and subsequently became curate at St. Paul's, Walworth, then a centre of advanced Anglicanism, where for many years he worked amongst the poor with great zeal and success. After this Bicknell joined an Anglican community at Stoke in Shropshire; when this broke up in 1879 he went to Bordighera, where for two years he was chaplain to the English visitors; here he bought a house and settled for the rest of his life, giving up clerical work in favour of scientific and artistic pursuits. In 1885 Bicknell published a quarto volume on the *Flowering Plants and Ferns of the Riviera and neighbouring Mountains*, the idea of which was suggested by J. T. Moggridge's *Contributions to the Flora of Mentone* (1864), whose author had exhorted others to follow his example. The book contains 80 plates, two or three species being figured on each, the subjects being selected from the 1100 drawings which Bicknell had made—many, however, being redrawn; they are accompanied by good descriptions, the provenance of the specimens figured being stated. A second series was projected but not published; many of his drawings were lent to Mr. H. S. Thompson for his *Flowering Plants of the Riviera*, but the small scale on which these are reproduced does scant justice to the originals. In 1896 Bicknell published a *Flora of Bordighera and San Remo*, which contains excellent original notes. In the summer he was accustomed to reside in a delightfully situated house in Val Casterino above S. Dalmazzo di Tenda; here he found an extensive series of prehistoric rock drawings, on which he published a volume. Bicknell threw himself with enthusiasm into everything that could advance the social welfare of the Bordighera; he established a museum which he left to the Commune, with the exception of his general collection of European plants, which goes to the Istituto Botanico di Genova to which during his lifetime he had been a generous contributor.

H. A. A. Van der Lek has recently issued an account in Dutch and French of the Verticillose of Cucumber (*Onderzeekingen over Tracheomycœen: De Verticilliose van den Komkommer*). It is a disease due to the attack of the soil fungus *Verticillium albo-atrum*, known also as a pest of potatoes; the fungus penetrates the vascular tissue from the root, and only becomes noticeable when it passes to the parenchymatous tissue of the leaf. Van der Lek considers that the cultivation of immune varieties of the host plant is the only method of treatment that promises success. The pamphlet is well-illustrated. The pamphlet is issued under the auspices of the Landbouwhoogeschool by H. Veenman, Wageninen.

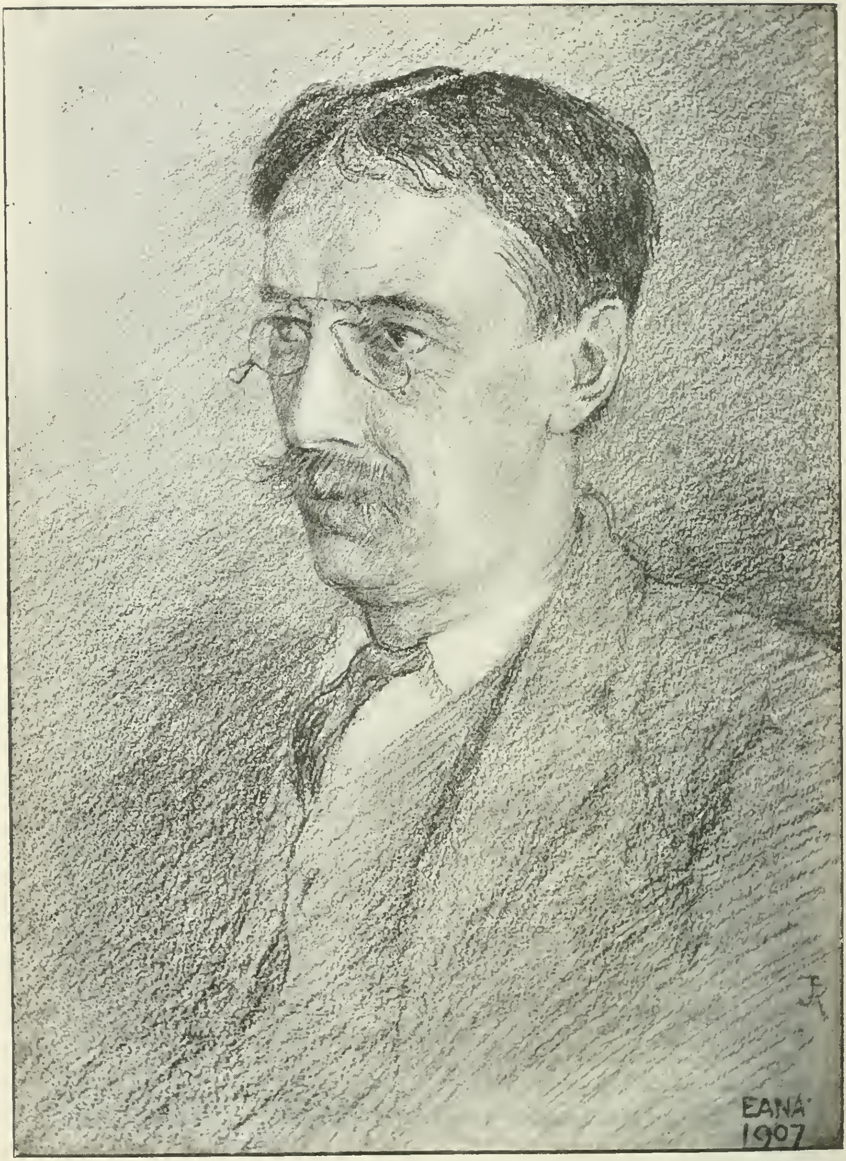
THE very handsome series of volumes entitled *The Bradley Bibliography*—"a Guide to the Literature of the Woody Plants of the World published before the beginning of the Twentieth Century: compiled at the Arnold Arboretum of Harvard University under the direction of Charles Sprague Sargent by Alfred Rehder"—has been completed by the publication of the fifth volume, which is devoted to an index of authors and titles and a subject index. Vols. i. and ii. (1911–12) are devoted to Dendrology; vol. iii. (1915) to Arboriculture and the Economic Properties of Woody Plants; vol. iv. (1914), to Forestry. The fact that they are printed at the Riverside Press, Cambridge, Mass., is sufficient indication that they are in every way admirably produced.

THE *Journal of Genetics* issued in August (vol. vii. n. 4) contains papers by A. St. Clair Caporn on "The Inheritance of Tight and Loose Paleæ in *Avena nuda* Crosses," on "An Experiment to determine the Heredity of Early and Late Ripening in an Oat Cross" and "On a Case of Permanent Variation in the Glume Lengths of Extracted Parental Types and the Inheritance of Purple Colour in the Cross *Triticum polonicum* × *T. eloboni*" (with two plates). There is also a "Report on Tests of Self-Sterility in Plums, Cherries, and Apples," prepared by Ida Sutton.

The Journal of the Linnean Society (Botany, xliv. no. 297: Sept. 12) contains a paper by Prof. Herdman on the distribution of certain Diatoms and Copepoda throughout the year, in the Irish Sea, with numerous illustrations; and the "Notes on *Calamopitys*" by Dr. D. H. Scott, of which an abstract appeared in this Journal for January (p. 29).

THAT plant-names are often misapplied is generally known, at any rate to botanists, but it is not often that one finds so striking an instance as is furnished by Sir Herbert Warren in his preface to *Good Stories from Oxford and Cambridge*, by Mr. Selby Henrey. These stories largely partake of the nature of what are termed "chestnuts," and we had hoped that Sir Herbert would have thrown some light on the modern application of the term: but he only says: "How the chestnut came to be the emblem of an old and good story seems uncertain: the invention or application, like many others, appears to be transatlantic." What he does make quite clear, however, is that he considers the chestnut and the horse-chestnut identical! He begins by a description of the latter, and goes on to say: "The chestnut fruit has many uses. Some are sweet and edible by nature, others hard and indigestible. Boys fight with these . . . it has lately been discovered that it is valuable not only for peace but for war"! This is no place for examining Mr. Henrey's chestnuts, some of which have been spoiled in his cooking; but the confusion indicated above by a man of Sir Herbert Warren's rank seems worth a note.

WE regret to record the death on Sept. 3, at the age of 86, of JAMES EUSTACE BAGNALL, of whom some account will be given in our next issue.



EDWARD ALEXANDER NEWELL ARBER.

EDWARD ALEXANDER NEWELL ARBER.

(1870–1918.)

(With Portrait after a Drawing by Janet Robertson.)

On his father's side Edward Alexander Newell Arber was descended from East Anglian and Welsh stocks, while his mother's extraction was entirely Scottish. His father's mother, Eleanor Newell, traced her descent, according to family tradition, from a Jersey sailor wrecked in Cardigan Bay, whose name "Noel" became corrupted into "Newell." From both sides Newell Arber derived a love of books. His father, Professor Edward Arber, D.Litt.(Oxon.), of Mason's College, Birmingham, published numerous reprints of the works of the less accessible English writers, at a time when such reprints were almost unknown. He married Marion, the daughter of another publisher, Alexander Murray of Glasgow. There was evidently a scientific bent in Mrs. Arber's family which came out strongly in her uncle, Dr. John Sutherland (1808–1891) who did pioneer work as a sanitarian, and was appointed head of the Commission sent out by Palmerston to enquire into the condition of the British troops in the Crimea.

Newell Arber's early life was a constant battle against the ill-health resulting from a severe attack of pneumonia at the age of five, and when he was fifteen it became necessary to send him to Davos, where he spent two seasons. It was at this time that the foundations were laid of his love of the Alps and alpine flowers; his first summer in Switzerland left him, as he wrote, "wedded to Botany with a consuming passion." This passion was fostered by twenty-five subsequent visits to Switzerland supplemented by one expedition to the Austrian Tyrol, where he went in order to examine a slightly different mountain flora. His studies of alpine vegetation bore fruit in a volume, *Plant Life in Alpine Switzerland* (1910), illustrated by his own photographs of the plants in their natural environment. Switzerland in winter was almost as dear to him as in summer, and skating in the "Continental" style became his favourite recreation. He himself attributed the final breakdown of his health largely to the fact that Switzerland had been rendered inaccessible by the European War. "The Alps," he wrote, "taken as a whole probably represent that particular side or phase of nature which I am by nature best able to appreciate and understand. It is the right key to me. It is chromatic rather than diatonic which in music I prefer as a whole." Newell Arber's idea of an æsthetic relationship between the Alps and chromatic music, recalls the fact that it was at Davos, also, that music first claimed him. He had a useful tenor voice and a great deal of that "watermanship" which is such an asset in choral singing. He gained a wide experience, especially in church music, Bach being his chief delight. But his taste was catholic, and his love of Wagner did not prevent his glorying in Handel.

As a boy, Arber's education was somewhat spasmodic on account of the interruptions of ill-health, and after he went up to Trinity College, Cambridge, in 1895, he again lost much time through illness. After he had taken the second part of the Natural Sciences Tripos in Botany and Geology, he was nominated in 1899 by T. McKenny Hughes, Woodwardian Professor of Geology, to a Demonstratorship in Palæobotany—a post which he held until his death nineteen years later. His scientific output, which is entirely included within this period, was concerned in part with recent plants, but more largely with palæobotanical problems. The geological aspect of his work has been considered, with a bibliography, by the present writer in the *Geological Magazine* (Dec. vi. vol. 5, p. 426, 1918), so it will be unnecessary to refer to it here. In a "Sketch of the History of Palæobotany," at which Arber was working at the end of his life, he gives reasons for dating the "Modern" period of his science from 1870. Since he himself happened to have been born in this year, his life may be said to have been practically coincident with the first half-century of progress in modern palæobotany.

The majority of Arber's papers dealt with the systematic botany of bygone geological ages, the material on which they were based being largely those "impressions" in which the internal structure of the plants is no longer preserved. He put unstinted labour into this kind of work, for he realized that systematic and descriptive studies constitute "the necessary foundations on which everything palæobotanical is built." He greatly regretted that botanists often seem scarcely aware of the existence of palæobotany except on its anatomical side. Arber was keenly alive to the importance of the anatomy of fossil plants, and he occupied himself with it whenever opportunity arose; *e. g.* in his studies of the type specimens of *Lyginodendron oldhamium* (Camb. Phil. Soc. 1902) and of the roots of *Medullosa* (Ann. Bot. 1903) and in his joint work with Hamshaw Thomas on *Sigillaria* (Phil. Trans. 1908). But he never lost sight of the fact that—since only a minute proportion of the palæobotanist's material is preserved in the form of petrifactions from which thin sections can be prepared—it would be fatal to narrow the science down to the sphere of anatomical studies. "Impressions" must always constitute our main source of information regarding the floras which have clothed the surface of the earth in successive geological epochs.

Among Arber's earlier contributions to systematic palæobotany was his Monograph of the Glossopteris Flora, which was published as one of the British Museum Catalogues in 1905. He was always interested in the palæobotany of the Southern Hemisphere, and, among other work on the subject, he described a collection of fossils from the Triassic and earlier rocks of New South Wales (Q. J. G. S. 1902) and certain Jurassic plants from Western Australia (Geol. Surv. W. Aust. 1910). His chief work on this line, however, was a memoir on the earlier Mesozoic Floras of New Zealand, recently published by the New Zealand Survey (1917). But the greater number of his papers related to the Carboniferous floras of Great Britain, to which he devoted many years' work in field and museum. Several of his memoirs on this subject appeared in the *Philosophical Transactions*—that on the Culm Measures of N.-W. Devon (1904), the Forest of Dean Coalfield (1912), the Wyre Forest Coalfield (1914), and the

South Staffordshire Coalfield (1916). In other journals he dealt with the fossil floras of the Cumberland Coalfield (Q. J. G. S. 1903), the South Lancashire Coalfield (Man. Mem. 1903), the Kent Coalfield (Q. J. G. S. 1909 and 1914, Geol. Mag. 1912 and Trans. Inst. Min. Eng. 1914 and 1916), the Newent Coalfield (Geol. Mag. 1910), the Yorkshire Coalfield (Proc. Yorks. Geol. Soc. 1910 and Geol. Mag. 1912), the Ballycastle Coalfield (Sci. Proc. Roy. Dublin Soc. 1912), the Concealed Oxfordshire Coalfield and the S. Staffordshire Coalfield (Trans. Inst. Min. Eng. 1916). As an example of a paper of less localized interest we may refer to his Revision of the Seed Impressions of the British Coal Measures (Ann. Bot. 1914), in which he endeavoured to bring some order into a chaotic subject. Among his studies of non-British Carboniferous plants, may be mentioned his account of *Psygmophyllum majus* from Newfoundland (Trans. Linn. Soc. 1912). He did not confine his attention, however, to Carboniferous floras, but studied the vegetation both of the newer and older rocks. In addition to the work already mentioned on the Mesozoic plants of the Southern Hemisphere, he dealt with Triassic species of *Zamites* and *Pterophyllum* (Trans. Linn. Soc. 1907) and *Yuccites* (Geol. Mag. 1909). He did relatively little work on Tertiary plants, but in this connexion his description of *Cupressinoxylon Hookeri* may be mentioned (Geol. Mag. 1904: see also *Life and Letters of Sir J. D. Hooker*, ii. 455–6).

In the latter part of his career Arber turned with enthusiasm to the study of very early floras. In 1915 he described some curious plant remains from the Devonian Rocks of N. Devon (with R. H. Goode, Camb. Phil. Soc.). His chief interest during the last year of his life was a general study of Devonian vegetation, from which he drew far-reaching theoretical conclusions; he has left a memoir on this subject which it is hoped will be eventually completed and published.

Arber possessed a strong "morphological sense," and his interest in the problems of phylogeny was both stimulated and controlled by his wide and detailed knowledge of the floras of successive epochs. Among his papers on the evolutionary history of plants we may mention his early study on homœomorphy (Geol. Mag. 1903), and his discussions of the Past History of the Ferns (Ann. Bot. 1906) and the Origin of Gymnosperms (Sci. Prog. 1906). But, from the phylogenetic standpoint, his *magnum opus* was the memoir on the Origin of Angiosperms which he wrote in conjunction with his friend John Parkin (Linn. Soc. Journ. 1907). As is so often the case when a subject has long been brooded over, the working hypothesis developed in this paper sprang into being at the last, almost at a flash, and the two workers saw that they had at length reached a possible solution of "the riddle of the Origin of Angiosperms, a problem that"—to quote from one of Newell Arber's letters of October 1906—"we have been hammering at for more than three years. (We have piles of MS. and heaps of full note books on the subject.) This came quite *suddenly*, for all at once we saw the road clear, and nearly all the clouds rolled away. Yet it is difficult to say why. I had been reading Wieland's big book on American Fossil Cycads, and suddenly

I grasped what no one else seems to have seen, *i. e.* that the Bennettiteæ are not Gymnosperms at all, but Angiosperms, and that to derive the modern Angiosperms from them on the principles which for some time past we have been setting up and laying hold of is as easy as A.B.C. . . . . The idea which has been putting us and other people off, is looking for the ancestry among Cycads (as used for recent plants), all ideas being too much warped by narrow notions derived from these modern things."

Professor von Wettstein, of Vienna, proposed and arranged the translation of "The Origin of Angiosperms" into German, and it appeared in the Öst. Bot. Zeitschr. in 1908. He wrote concerning the paper,—"As I have been occupied for some years with the same question, I know how to appraise its great worth, although I represent totally different views." The trouble taken by the Austrian professor to give publicity to a theory which ran altogether counter to his opinions, deserves to be placed on record as a remarkable instance of scientific broad-mindedness. It is perhaps of some interest that the portrait of Arber which accompanies the present notice is reproduced from a drawing made in 1907, the year in which "The Origin of Angiosperms" was written and published. In 1908 Arber and Parkin produced a second instalment of their joint studies, in the form of a paper on the relationship of the Angiosperms to the Gnetales (Ann. Bot.).

Any attempt to summarize those qualities which characterized Arber as a researcher must include a reference to his boundless capacity for work and to his power of envisaging problems broadly and in true perspective. But perhaps the feature of his mind which had the most individualizing effect on his output, was his faculty of analysis, which was so highly developed as to be at times actually burdensome to him. The chief thing he asked of a mental recreation was that it should be of such a nature as to give rest to the critical faculty and, in his own words, "to take the strain off." "A highly critical spirit" he wrote, "is one of the gifts or faults of my character, whichever way you like to put it. I am one of those unhappy people who suffer themselves to hear for a time an orchestra as a whole, but prefer quickly to bring into play the faculty of hearing each separate instrument and seeing how the total effect is built up. This power of analysis or criticism (using the latter in a wide sense) is exhausting . . . and involves much brain work."

Newell Arber's work was indeed carried out at the white heat implied by these last words. In the space of a relatively short life he had experienced far more of the pleasure and also of the pain of research than often falls to the lot of the biologist—even if he reaches and passes his three score years and ten.

A. A.

NEW RUBIACEÆ FROM THE BELGIAN CONGO.

By H. F. Wernham, D.Sc., F.L.S.

Of the plants described in the present paper, seven were collected in 1914 in the Equatorial district of the Belgian Congo by A. Nannan, of the Belgian Agricultural Department, and one by H. Vanderyst, in the Kwango district. The collection includes over fifty Rubiaceæ, of which these eight are new; the types are in the National Herbarium, to which the collection was brought by Dr. Vermoesen, Inspector of Agriculture in the Belgian Congo.

Apart from the actual novelties, the following rare and interesting plants formed part of the collection:—*Justenia orthopetala* (*Vanderyst* 3508! 4266! 4290!) hitherto known only from Angola, where it was discovered by Welwitsch, and described by Hiern in Cat. Welw. Afr. Pl. ii. 452; *Pouchetia Gilletii* de Wild. (*Vanderyst* 4317!) in Ann. Mus. Congo Sér. v. iii. 289 (1910), which is represented at present in British herbaria by a small shoot preserved at Kew; *Bertiera capitata* de Wild, from Ituri (leg. *Lacomblez* 173!), hitherto unrepresented in our herbaria, and confined to the Congo.

The genera are arranged in accordance with their order in Bentham & Hooker's *Genera Plantarum*.

Mussenda Nannanii, sp. nov. Frutex volubilis partibus in vegetativis omnino sparse nec tamen obscure potius scabridulius hirtellus, ramulis gracilibus teretibus mox glabrescentibus striatis lenticellosis. *Folia* pergamacea late elliptica vix acuminata acutissima basi brevissime cuneata petiolata; *venæ* principales subtus prominulæ, laterales tenues utrinque 15 v. plures, rete interveniente conspicuo; *stipulæ* breves crassiusculæ acuminato-deltoideæ extus dense rufo-hirtellæ basi breviter vaginantes. *Flores* albi inter minores (pro genere) umbellorum quorumque ± 7–9 flor. in corymbis dispositi dense aurato-sericeis, pedunculis primariis plus minus elongatis, pedicellis tamen ultimis brevissimis: *bracteæ* parvæ lanceolatæ acutæ plus minus concaveæ. *Calyx* anguste obconicus extus dense aurato-sericeus, lobis minoribus similiter indutis, anguste deltoideis inter breviores, acutis acuminatis, lobo foliaceo minusculo obovato venoso basi leniter in petiolo breviusculo producto. *Corollæ* tubus gracilis, extus præsertim infra appresse hirtus, limbi angusti lobis lanceolatis longe acuminatis acutis extus dense flavo-strigosis, intus densissime saccharato-tomentosis.

Near R. Ikilemba (Equator), *Nannan* 54! 26 August, 1914, dry season. "Plante grimpante le long des arbres. Fleurs blanches. Se rencontre au borde rivière. Sauvage, très répandue. Nom indigène: *Lofandja*."

Leaves 9–11 cm. × 5–6 cm., with *petiole* 1–1·5 cm. long; *stipule* 5 mm. deep. Main *peduncles* about 3 cm. long; *bracts* 2–3 mm. long. *Ovary* (calyx-tube) 2·5 mm., *calyx*-lobes barely 2 mm. long; foliaceous calyx-lobe 4–5 cm. × 2·5–3 cm., with petiole 1 cm. long. *Corolla*-tube 3–3·5 cm. long, limb barely 8 mm. in diameter.

Of this species *M. Chippii* Wernham (in Journ. Bot. 1913, 237) is the nearest ally; it is readily distinguished by the venation of the leaves, the indumentum of the corolla, and the narrower corolla-limb.

Sabicea congensis, sp. nov. Frutex volubilis ramulis graciliusculis dense præsertim in juventute patente hispidulo-pilosis. *Folia* chartacea elliptica apicem versus leniter necnon longiuscule acuminata

obtusiuscula, utrinque præsertim subtus in venis patulo-pilosa hispidula, *venæ* primariæ subtus prominulæ lateralibus utrinque vix 10, rete interveniente obscuro; basi acuta, *petiolo* tenuiusculo hirsuto longiusculo; *stipulæ* membranaceæ late ovatæ obtusæ glabratæ, mox reflexæ. *Flores* in axillis arcte congesti nec plures, sessiles; *ovarium* densissime flavo-lanuginoso-sericeum; *calycis* lobi lineari-lanceolati acutissimi ciliati inter longiores. *Corollæ* tubus e basi extus glabro insuper leniter sed minime dilatatus extus dense hirsutus; lobi anguste lanceolati breves patentes dorso præsertim apicem versus barbati intus glabri.

Near the village of Boyeka (Equator), *Nannan* 93! 28 August, 1914, end of the dry season. "Plante grimpante, tige recouverte d'un léger duvet ainsi que les feuilles. Se rencontre dans les endroits humides. Fleur blanche et mauve. Sauvage, peu répandu. Nom indigène: *Bosusu*."

Leaves 10–11 cm. × 4–4·5 cm., with *petiole* 1·5 cm.; *stipule* about 5 × 4 mm. *Calyx*-lobes 5 mm. or longer. *Corolla*-tube about 1·7 cm. long, lobes 3·5 mm. long.

This species is allied to *M. Schumanniana*, from which it differs chiefly in its indumentum and the laxer venation of the leaves.

Stipularia mollis, sp. nov. Frutex modestus ramulis obscure in juventute quadrangularibus tardius subteretibus glabrescentibus, novitatibus dense lanuginoso-sericeis. *Folia* majuscula crasse chartacea, elliptica utrinque acuminata acuta, insuper glabra subnitentia, subtus valde discoloria subcanescentia minute arachnoidea necnon dense pube hispidulo necnon molle induta; *venæ* primariæ subtus valde conspicuæ fuscæ lateralibus tenuibus utrinque ca. 18, rete interveniente notabili; folia in juventute insuper dense incano-arachnoidea subtus densissime fulvo lanugine sericeo induta. *Stipulæ* e basi ovato attenuato-acuminatæ, dorso molliter tomentosæ. *Flores* in capitulo alari involucro campanulato omnino occlusi, extus basin versus venisque pubescente subsessili.

Near Boyeka village, *Nannan* 62! 26 August, 1914. "Plante atteignant environ 1·50 m. de hauteur. Se rencontre au bord de l'eau. Fleur violette. Sauvage, assez répandue. Nom indigène: *Losele manene*.

Although mature flowers are absent from this specimen, it is readily distinguished as a new species by the conspicuous, soft hairy covering of the leaves, the dense, soft, woolly indumentum of the young parts being particularly distinctive. *Leaves* 13–15 cm. × 7–8 cm., with *petiole* reaching scarcely 2 cm. in length; *stipules* about 1·5 cm. × 4·5 mm. *Inflorescence*-cup (of involucre) about 4 cm. deep, and over 6 cm. in diameter at the mouth; the short, stout, stalk of this may be nearly 5 mm. in length.

Tricalysia calensis, sp. nov. Frutex erectus glaber, ramulis gracilibus subteretibus. *Folia* papyracea translucentia, longiuscule acuminata vix acuta elliptica basi sæpius obtusa, *petiolo* brevissimo; *venæ* primariæ tenues tamen conspicuæ prominulæ laterales utrinque 6–7, reticulo interveniente transverso notabili; *stipulæ* vaginam brevissimam formantes inter petiolos breviter necnon acutissime apiculatam. *Flores* albi in axillis densiuscule congesti plurimi, pedunculis primariis 2–3 brevissimis; *pedicelli* breves apice in calyculum minimum dilatati minute adpresse hirtellum bidentatum; *ovarium* minutum subpyriforme glabrum; *calycis* limbum late cupulare extus minute hirtellum obscure dentatum. *Corollæ* extus glabræ tubus brevis cylindricus, lobis 5 oblongis obtusis subæquilongis. *Antheræ* exsertæ lineares glabræ.

In the neighbourhood of Eala (Equator), *Nannan* 44! 25 August, 1914, during the dry season. "Arbuste atteignant environ 2·50–3 m. de hauteur. Fleurs blanches, sans odeur. Se rencontre en forêt dans les endroits secs. Sauvage, assez répandue. Nom indigène: *Losongo*."

Allied to *T. reticulata* Hiern, from which it differs especially in the much smaller calyces, and the many-flowered inflorescence. *Leaves* 7–9 cm. × 2·5–3 cm., with *petiole* 4 mm. at longest; *stipule*-sheath barely 1 mm. deep, the apiculus scarcely 1 mm. long. *Inflorescence* 1 cm. in diameter at most. *Calyx*, with ovary, 1·5–2 mm. long. *Corolla*-tube 4–5 mm., lobes 5 mm. *Anthers* 3·5 mm. long.

Vangueria oblanceolata, sp. nov. Frutex glaber, ramulis lævissimis gracilibus. *Folia* firme chartacea utrinque glaberrima supra nitentia uniformiter oblanceolata breviuscule caudato-acuminata subacuta basi attenuato-caudata, petiolo brevi; *venæ* primariæ subtus prominentes, lateralibus utrinque 7–8 distantibus rete interveniente prominulo conspicuo; *stipulæ* crassæ parvæ lanceolato-deltoideæ acuminatæ. *Flores* albi in cymulis divaricatis dispositi alaribus laxissimis paucifloris abbreviatis, ramulis necnon pedunculis pedicellisque tenuibus; *bracteæ* minimæ subsetaceæ. *Calyx* infundibularis sulcatus, dentibus late deltoideis acutissimis. *Corollæ* tubus brevis necnon latus, late infundibularis parum tamen insuper ampliatus extus glaber, lobi 5 acuminato-triangulares acuti demum erecti, ore densissime incano-barbatus. *Fructus* baccatus pisiformis apice umbonatus.

Near R. Ikilemba (Equator), *Nannan* 56! 26 August, 1914, dry season.

A shrub reaching about 1 m. 50 cm. in height, with white odourless flowers, and green fruits of the size of a pea. "Sauvage, très répandu, tiges très flexibles, servent à faire des ligatures. Nom indigène: *Lofetjo*."

Allied to *V. euonymoides*; readily distinguished by the regularly oblanceolate *leaves*, 8–12 cm. long, of which about 1 cm. is the length of the narrow apical acumen, and 3–3·5 cm. broad, in the upper two-thirds; *petiole* rarely more than 7–8 mm. long; *stipules* 2 mm. long. *Inflorescence* 4–6-flowered, 3 cm. along greatest diameter. *Calyx* barely 1 mm. long. *Corolla*-tube 3·5 mm. long, 3 mm. wide at mouth, lobes 2·3 mm. long. *Berry* about 6 mm. in diameter.

Cuviera latior, sp. nov. Frutex glaberrimus, ramulis lævissimis subteretibus validiusculis striatis nodis tumidis exesis (formicarum verisimiliter domatio); *folia* magna pergamacea late oblonga parum acuminata basi cordata valde inæqualia obliqua, petiolo brevi tamen manifesto; *venæ* primariæ conspicuæ lateralibus utrinque 10–12; *stipulæ* in vaginam latam connatæ brevissimam supra arcuatam obscure inter petiolos apiculatam. *Flores* pro genere magna in cymis laxis dispositi paucifloris furcatis, *pedunculo* valde complanato, *pedicellis* brevissimis. *Calycis* lobi 3 venosi late lanceolati longe acuminati magni foliacei. *Corollæ* tubus latus brevissimus, lobi 5 oblongi acuminatissimi acutissimi apice subsetacei cucullati. *Ovarium* alte sulcatum; *stylus* pinguis dense hispidulus.

North of Boyeka, *Nannan* 139! 31 August, 1914; dry places in forest. "Fleur verte et rouge. Sauvage, peu répandue. Nom indigène: *Bonboku*."

Notable for the broad calyx-lobes and the large flowers. *Leaves* 20–26 cm. × 8–9 cm., with petiole 6–8 mm. at longest; *stipule*-sheath 2·5 mm. deep. *Peduncle* 2 cm. or long, forking at the top into two floriferous branches about 10 cm. long. *Calyx*-lobes 3–3·5 cm. long, and 1 cm. broad, or more. *Corolla*-tube barely 4 mm. long; lobes 1·6 cm. × 4 mm. *Anthers* 2 mm. long. *Style* 1 cm. long.

Ixora Vermœsenii, sp. nov. Arbor omnino glaberrima ramulis lævissimis striatis obtuse subquadrangularibus. *Folia* papyracea elliptica apice longiuscule acuminata necnon obtusa basi cuneatim in *petiolum* notabilem angustata; *venæ* primariæ subtus prominulæ, utrinque 5–6, distantes. *Stipulæ* brevissimam in vaginam connatæ subcarneæ. *Flores* albi umbellis in corymbosis laxis plus minus divaricatim dispositi amplis in axillis terminalibus oriundis pedunculis conspicuis gracilibus; *bracteæ* subsetaceæ parvæ nec obscuræ. *Calyx* campanulatus sub-hemisphæricus limbo truncato. *Corollæ* tubus brevissimus insuper parum ampliatus, a lobis oblongis obtusissimis manifeste superatus. *Antheræ* exsertæ, lineares longæ glaberrimæ. *Stylus* filiformis apice obtuse bilobatus.

In the forest about Eala, *Nannan* 3! 24 June, 1914. Dry places; widely distributed. The sap is used to cure stomachic complaints. Native name: *Weigné*.

A tree about 10 metres in height, the species being distinct in the very short corolla-tube. The nearest allied species is *I. brachysiphon* from the Bagroo River, with a 5-cleft calyx and much smaller corolla-limb. *Leaves* 8–12 cm. × 3–4 cm., *petiole* to 1·5 cm. long. Primary *peduncles* 3·5 cm. or longer. *Calyx* 1·5 mm. radius. *Corolla*-tube 3·5 mm., lobes 5 mm. or rather longer, 1·7 mm. wide. *Anthers* 4–5 mm.; *style* exserted 7 mm.

Rutidea Vanderystii, sp. nov. Frutex volubilis, ramis gracilibus pilosis striatis; *folia* firme papyracea, elliptica latiuscule acuminata subacuta basi subcordata, *petiolo* brevi appresse hirsuto; *venæ* præsertim subtus conspicuæ prominulæ primariis lateralibus utrinque 5–6 longe intra marginem arcuatim anastomosantibus; *stipulæ* a basi late deltoideo longe subulato-acuminatæ indivisæ. *Flores* umbellarum in thyrsis parvis ramulos laterales terminantibus dispositi, ramulis cum pedunculis dense ferrugineo-pubescentibus; *bracteis* brevibus tamen conspicuis lineari-setaceis. *Calyx* minutus dense strigosus pilis lobos obscurantibus. *Corollæ* parvæ tubus gracillimus extus sparsiuscule plus minus appresse pilosus, lobi ovati acuti intus glabri.

Bugunu, *Vanderyst* 4294! 28 May, 1914.

Distinguishable by the simple stipules, the bracts, and the small flowers. *Leaves* 9–12 cm. × 5–6 cm., *petiole* to 8 mm. long; *stipule* as much as 1 cm. in length. Main rachis of *inflorescence* about 5 cm. long, lowest lateral peduncles 1 cm. or longer. *Bracts* to 7 mm. *Corolla* tube 5–6 mm. long, lobes 1·5 mm. long. *Anthers* 1 mm. long.

The present opportunity is taken to publish descriptions of the two following interesting species, collected by Bates in the Cameroons:—

Globulostylis cuvieroides, sp. nov. Arbor parvus patens glabra ramulis lævibus striatis graciliusculis. *Folia* papyracea elliptico-oblonga apice acuminata obtusissima basi subito acuta, *petiolo* breviusculo: *venæ* primariæ supra impressæ subtus prominulæ, laterales distantes utrinque 5–6 intra marginem arcuatim anastomosantes. *Flores* majusculi simplicibus in umbellis pedunculatis ±5-floris dispositi pedicellati, *bracteis* linearibus ad lanceolatis basi plus minus connatis. *Calycis* lobi oblongo-lineares apice rotundati. *Corollæ* tubus latus necnon brevis, lobi ovato-lanceolati acuminati cucullato-acutissimi. *Styli* globus lobulatus densissime tomentosus ceterum glabri.

Cameroon Mts.: Bitye, Yaunde, *Bates* 1016!

A small spreading tree, in swamp. Calyx light-green; corolla dark brownish green; style white. *Leaves* about 13 cm. × 4·5 cm., with *petiole* about 1 cm. long; *stipules* loosely sheathing to a depth of some 3 mm., bearing interpetiolar, more or less decurrent, subulate apiculi 3 mm. long. Primary axillary *peduncle* 1–1·8 cm. long; *bracts* 9 mm × 2·5 mm. *Pedicels* 1–1·5 cm. *Calyx*-tube and ovary 4 mm. deep; calyx-lobes 1·6 cm. × 5 mm. *Corolla*-tube 5–6 mm. long, ± 5 mm. wide at mouth; lobes 1·3 cm. × 6 mm. *Anther* 1·5 mm., filaments 3 mm. long. Whole *style* 1·2 cm. long, including the globe, 3 mm. high, its base 2 mm. above the base of the style, 6 mm. length of style above globe, and the *stigma* 1 mm. height above that: the globe is 6 mm. in horizontal diameter.

This, the third species of my genus *Globustylis*, published in Cat. Tabl. Nig. Pl. 49, is of especial interest from its likeness to *Cuviera*, emphasized by the elongation of the peduncles and pedicels, and by the elongated calyx-lobes, which features readily distinguish it from the two species previously described; while the simply umbellate inflorescence, and the globe upon the style, cause it to be assigned without doubt to the genus in question.

Amaralia Batesii, sp. nov. Frutex ramulis gracilibus dense fulvo-sericeis novitate densissime indutis; *folia* papyracea supra glaberrima venis impressis subtus venis primariis prominulis fulvo-sericeis aliter glabra lateralibus utrinque ca. 10, elliptica modice acuminata apice acuta, basi obtusa v. subtruncata, *petiolo* brevi validiuscula; *stipulæ* majusculæ oblongæ acuminatæ subacutæ dorso dense flavo-sericeæ carinatæ. *Flores* singuli in axillis oriundi subsessiles, *caly-*

culo campanulato conspicuo, *ovario* conspicue sulcato qua *calyx* dense sericeo, hic tubo campanulato, lobis ovatis breviter plus minus subito necnon acutissime acuminatis; *corolla* inter minores extus dense minute pubescens, lobis ovato-semicircularibus apice rotundatis.

Cameroon Mts.: Bitye, Yaunde. *Bates* 971!

Allied to my *A. micrantha* (Journ. Bot. 1917, 6), but at once distinguishable by the venation and base of the leaves, the stipules, etc. *Leaves* 9–11·5 cm. × 4–5 cm., *petiole* not exceeding 1 cm. long; *stipule* 1·3 cm. × 3·7 mm. *Calyculus* 4–5 mm. deep, *ovary* 5 mm.; *calyx*-tube 5–6 mm., 7–8 mm. wide at mouth, lobes 7 mm. × 5 mm. *Corolla*-tube 2–2·3 cm. long, 1·7 cm. wide at mouth, lobes 8 mm. × nearly 1 cm. wide.

NEW OR NOTEWORTHY FUNGI.—Part VI.

(Continued from p. 294.)

By W. B. Grove, M.A.

(Plate 550.)

274. **Ceuthospora Mahoniæ**, sp. n.

Stromatibus epiphyllis, gregariis, dimorphis: (1) pro ratione magnis, durissimis, convexis, prominentibus, solidis, rotundatis v. oblongis, ½–1 mm. diam., e folii cortice efformatis, intus brunneis, extus nigrescentibus, epidermide lacerata velatis, dein cinctis, loculos 20–40 minimos confertos rotundos albo-farctos forentibus, (2) minoribus 250 μ 1–7-locellatis, truncato-conicis, denique in discum parvum rotundum albido-furfuraceum poro centrali perforatum erumpentibus. Sporulis rectissimis, cylindricis, apice obtusis, continuis, hyalinis eguttulatisque, 10–14 × 1½–2 μ.

Hab. in foliis emortuis *Mahoniæ japonicæ*, Studley (Wk.), Junis.

The state of things in this species on *Mahonia* is very similar to that of the species on *Euonymus* described in Journ. Bot. 1916, p. 190; there are two kinds of stromata, differing in appearance, (*a*) subunilocular or at least paucilocular, (*b*) multilocular, the latter being later in development than the former, though the spores are exactly identical in both. But the larger stromata of *C. Mahoniæ* are quite different in shape from those of *C. Euonymi*, and resemble more those of *C. Alaterni* Thüm.

275. Ceuthospora latitans Grove.

Dothidea latitans Fr. Syst. Myc. ii. 552. *Dothiorella latitans* Sacc. Syll. iii. 241. *Dothiopsis latitans* Karst. Hedwig. 1884, p. 20. *Phyllachora latitans* Sacc. Syll. ii. 610. ? *Cytospora endophylla* Fr. Summa Veg. Sc. p. 413.

Conceptacles amphigenous, roundish, immersed, then convex and erumpent, splitting the epidermis into four or five laciniæ, black, about ½ mm. diam.; loculi one or several, immersed in a brownish stroma and often imperfectly divided. Spores cylindrical, straight, obtuse at both ends or somewhat tapering below, 8–10 × 1½–2 μ (12–13 × 2 μ, Sacc.).

On dry dead blackening leaves and twigs of *Vaccinium Vitis-idæa.* Cheviots; Shropshire; Ayrshire, etc.

There is no doubt this is the pycnidial stage of *Phacidium Vaccinii* Fr. The conceptacle is sometimes unilocular, but it is often imperfectly divided like most of the Cytosporas; in its habit (erumpent by laciniæ) it reminds one of a *Phacidium*, and its spores are so exactly like those of *Ceuthospora phacidioides*, which is the spermogone of *Phacidium multivalve* K. & S., that it is evidently a member of that form-genus. Nevertheless in its sometimes botryose pycnidia it tends towards *Dothiorella*, and is in fact intermediate between that and *Ceuthospora*. See Massee, Fung. Fl. iv. 57.

It is interesting to note that, while our British specimens accord exactly with those ordinarily met with in Germany, Sweden, and Finland, *one* example published by Fries (Scler. Suec. no. 281), as shown in sections kindly cut by Miss E. M. Wakefield, contained in the same conceptacles and on similar sporophores some brown spores, which differed from the colourless ones mixed with them only in being less linear and slightly more irregular. These could be hardly anything else than a further development (? more mature) of the *Ceuthospora* spores, for stages intermediate in colour were observed among them. The slides are preserved in the Kew Herbarium.

276. **Ascochyta Boydii**, sp. n.

Phyllosticta Alismatis Sacc. & Speg. Mich. i. 144. Sacc. Syll. iii. 60.

Maculis in quoque folio plerumque paucis, sinuosis v. irregulari-rotundatis, 5–12 mm. lat., pallide brunneis v. albidis, margine castaneo v. brunneo-fuligineo cinctis. Pycnidiis epiphyllis, copiosis, 50–130 μ diam., pallide brunneis, dein obscurioribus, poro pertusis; contextu vere ascochytoidea. Sporulis primo obovoideis vel ellipsoideis, continuis, dein oblongis, 1-septatis, sæpe curvatis flexisve, utrinque rotundatis v. basi acutis, sæpius biguttulatis, omnino achrois, $10–12 \times 2–2\frac{1}{2}\ \mu$.

Hab. in foliis vivis *Alismatis Plantaginis.* Stevenston, Ayrshire (Boyd); Cheshire (Ellis). Jul.–Sept.

This is undoubtedly a more advanced state of *Phyllosticta Alismatis* S. & S.; the spots are exactly of the same character. But what its relation is to the *Ascochyta Alismatis* of Trail or of Ellis & Everh. it is difficult to say: the spores of these latter (which are the same species) are longer and quite straight, and the spots are far more numerous, different in colour, and only 1–2 mm. broad.

277. ASCOCHYTA EQUISETI Grove.

Phoma Equiseti Desm. Exs. no. 183. Sacc. Syll. iii. 168; x. 187. *Sphæria Equiseti* Sacc. Syll. ii. 442.

Pycnidia seriate or widely scattered, oval or subglobose, immersed, blackish, 200–300 μ diam., covered by the bleached epidermis, which is then pierced by the minute ostiole and afterwards more widely torn; texture soft, pale brown, pseudo-pycnidial. Spores at first ovoid, continuous, biguttulate, $6–7\frac{1}{2} \times 3\ \mu$, then oblong, 1-septate, acute at one or both ends, sometimes bent at the septum, $10\frac{1}{2}$–12 × 3–$3\frac{1}{2}$ μ, cells often unequal.

On dry dead stems of *Equisetum limosum*. Ardrossan (Boyd). Harborne; King's Norton. Mar.–Apr. The so-called *Phoma*, which has been recorded as British by Bucknall and by Broome, is merely the young undeveloped state; both kinds of spores may be found in the same pycnidium.

278. Ascochyta Mercurialis Grove.

? *Phyllosticta mercurialis* Desm. Sacc. Syll. iii. 53.

Spots large, indefinite, greyish-ochreous, without a distinct border. Pycnidia epiphyllous (usually), ± crowded, immersed, lens-shaped, pale brownish-yellow, 100–125 μ diam., pierced at length by a delicate pore; tissue soft, plectenchymatous, firmer round the pore. Spores oblong, rounded above or at both ends, usually straight, rarely guttulate-septate, 9–10 × $2\frac{1}{2}$–3 μ.

On living leaves of *Mercurialis perennis*. Arran and Ayrshire (Boyd). July, Aug.

The species originally described by Desmazières is very doubtful, some mistake having apparently crept in: it is suggested that it is a misunderstood *Cercospora*, which seems improbable with so careful an observer. But the specimens which are found in herbaria under this name appear for a long time as a *Phyllosticta*, although ultimately, as shown by Mr. Boyd's specimens, they develop into an *Ascochyta*. The spots are more common than the pycnidia; they are usually described as "small, sometimes confluent," but in the Arran specimens they occupy at least half of the leaf, and are quite different in character from those typical of *Cercospora Mercurialis* Pass.

279. Ascochyta Tiliæ Kab. & Bub. in Hedwig. xlvi. 293.

Spots equally visible on both sides, roundish or irregular, variable, 5–15 mm. diam., of a dark smoky colour, at length becoming thin and translucent-grey, without a border or darker at the margin. Pycnidia generally epiphyllous, numerous, densely scattered over the spots, immersed, roundish, 100–150 μ diam., transparent-brownish, with a darker border; texture as in a true *Ascochyta*. Spores oblong, rounded at each end or somewhat tapering below, hardly or not at all constricted, hyaline, without guttules or 2–4-guttulate, 8–10 × $2\frac{1}{2}$–3 μ.

On living and fading leaves of *Tilia grandifolia*. West Kilbride, Ayrshire (Boyd). Jul.

The spots are usually of a uniform dull colour, without any distinct differently-coloured border, but are nevertheless so definite, and the attacked tissue becomes so disintegrated, that it drops out in fragments and leaves a roundish "shot-hole," or a larger irregular one composed of several which are only separated by the persistent leaf-veins. In no case was there a purple margin, as in some of the Bohemian specimens.

280. Ascochyta Viburni Sacc. Syll. iii. 387.

Phyllosticta Viburni Roum. Fung. Gall. no. 2036.

Spots irregularly placed, roundish or sinuous, 3–10 mm. across, pallid, with a purplish border. Pycnidia epiphyllous, globose-lens-shaped, immersed, at length erumpent at the apex, pale-brownish, then darker, about 200 μ diam. Spores oblong or subcylindraceous-ellipsoid, rounded at both ends or faintly tapering below, 1-septate, hardly constricted, $9–12 \times 2–3\ \mu$.

On living leaves of *Viburnum Opulus*. Beith, Ayrshire (Boyd). Aug.

281. **Diplodina Cirsii**, sp. n.

Pycnidiis sparsis, ovalibus, ca. $\frac{1}{4}$ mm. long., atris, prominulis, epidermidem ostiolo papillulato pertuso levantibus tantillumque penetrantibus; contextu atro-fusco parenchymatico. Sporulis oblongis, utrinque rotundatis, diu continuis, dein 1-septatis, plerumque ad septum constrictis, subinde curvulis loculisque duobus inæqualibus, omnino achrois, rarissime 1- vel 2-guttulatis, $7–9 \times 2\frac{1}{2}–3\ \mu$; sporophoris non visibilibus. (Tab. 550 f. 5.)

Hab. in maculis albidis caulium *Cirsii arvensis*, King's Norton, Junio.

The pycnidia and spores closely resemble those of *D. Hyoscyami* Vest., though the latter are not quite so large; but the creeping hyphæ assigned to that species were not present. Unless carefully examined this species may easily be mistaken for a *Phoma*.

282. Diplodia Opuli Pass in Atti R. Accad. Lincei Rom., Mem. 1889, vi. 465. Sacc. Syll. x. 281.

Phoma hyalina (B. & C.) Sacc. *in Viburno.*

Pycnidia gregarious, globose with a papillate ostiole, black, about $\frac{1}{2}$ mm. diam., sometimes two together, long covered by the bark, the ostiole then piercing it by a short slit, and at length circumscissile, falling off and leaving a wide circular opening; texture thick, parenchymatous, dark brown with an underlying purplish tinge. Spores oblong-ellipsoid, obtusely rounded at both ends, thick-walled, for a long time hyaline, continuous, very granular within, $21–27 \times 8–10\ \mu$, [" at length 1-septate, dingy-yellowish, not constricted, $20 \times 10–12\ \mu$," Pass.]; sporophores stout, nearly as long.

On dead twigs of *Viburnum Opulus*. Hunt's Cross, Cheshire (Ellis). April.

Although these specimens yielded no septate spores, yet the character of the spore and pedicel (the latter showing a faint yellowish-brown tinge in mass) indicated that they were probably a young state of a *Diplodia*. Moreover, the pycnidia were almost exactly in accord with the description, except that there was no trace of " blue," but only a distinct purplish tinge beneath the brown; they belong therefore no doubt to Passerini's species. *Phoma hyalina* (B. & C.) is certainly nothing but an early stage of a species of *Diplodia*, according to its host.

283. Hendersonia Typhæ Oud. Mat. Flor. Myc. Neerl. ii. 19. Sacc. Syll. iii. 435.

Var. major, var. nov.

Pycnidiis amphigenis, copiosis, sparsis, globosis, papillatis, atris, semi-erumpentibus, 100–200 μ diam.; contextu molli, tenui, pellucido-fusco. Sporulis subclavato-fusoideis, sursum rotundatis v. attenuatis, deorsum acutatis, 5–9-septatis, olivaceo-fuscis, eguttulatis, 60–80 × 7 μ. (Tab. 550. f. 6.)

Hab. in foliis emortuis *Typhæ latifoliæ*, Killermont, Dumbartonshire (Boyd), Oct.

The spores stand erect in a single layer within the semi-transparent pycnidium, all springing from the base, and ± parallel or converging towards the ostiole. The walls and septa of the spore are conspicuous and about 1 μ thick, olive-fuscous in colour, while the lumen of each loculus is pale-greenish. Oudemans' species was on stems of *T. angustifolia*, the spores measured about 50 × 7 μ and had 5 septa, but their form and arrangement were the same as in this variety. This species, and other similar ones such as *H. tenella* Schröt., and *H. mollis* Grove, which have a wall tending to be "pseudopycnidial," should form a distinct section of the genus.

284. HENDERSONIA VAGANS Fckl. Symb. Myc. p. 392. Sacc. Syll. iii. 419. f. CUSPIDATI f. nov.

Pycnidiis gregariis, maculis pallidis insidentibus, atris, globosis oblongisve, prominentibus, 200–250 μ long., epidermidem ore irregulari rumpentibus; contextu olivaceo, crassiusculo, at molli, e cellulis parvulis parenchymaticis conflato. Sporulis oblongo-ovalibus, utrinque rotundatis, subinde curvulis, 13–17 × 5½–7 μ, 3-septatis vel interdum æqualiter 2-septatis, dilute olivaceis, non constrictis, sporophoris linearibus subpersistentibus et sporis longioribus suffultis.

Hab. in caulibus emortuis *Polygoni cuspidati*, Edgbaston, Birmingham, Maio.

Very rarely there is a single longitudinal septum. Spores, as usual, at first colourless, then pale olive, continuous, then 1-septate, equally or unequally 2-septate, and finally 3-septate. This species is distinguished from other triseptate forms of the same genus by its much paler spores, which do not tend in the least to be brown; the linear and rather persistent sporophores are also a marked feature.

285. STAGONOSPORA HYGROPHILA Sacc. in Malpigh. 1899, xiii. 22, f iii. 2; Syll. xvi. 947. Var. VERMIFORMIS, var. nov.

Maculis amphigenis, parvis, marginalibus, rotundatis, albido-ochraceis, margine fulvo distincto. Pycnidiis plerumque hypophyllis, sparsis, paucis, lentiformibus, aureo-fulvis, nigrescentibus, 120–220 μ diam., epidermide tectis, dein poro erumpentibus; contextu tenuissimo, pallido, circa porum obscuriore. Sporulis verniformibus, curvulis, utrinque attenuatis, sed apice ipso rotundatis, 3-septatis, minute guttulatis, plerumque ad septa constrictis, primo hyalinis, dein flavidis, subinde parva mucosa appendicula utrinque instructis, tandem effluentibus globulosque melleos supra porum formantibus, 25–32 × 4–5 μ. (Tab. 550. f. 7.)

Hab. in foliolis viventibus *Oxalidis Acetosellæ*, Dalry, Ayrshire (Boyd), Aug.

Differing from the type in the strongly constricted and larger spores. Mr. Boyd remarks that the spots were not uncommon, but only two leaflets could be found on which pycnidia occurred; round Birmingham the spots can be found (recognisable by their bright orange-brown border), but no pycnidia have yet been seen.

286. LEPTOTHYRIUM HEDERÆ Starb. Stud. p. 96. Sacc. Syll. xi. 554.

Sphæria (*Dothidea*) *Hederæ* Moug. in Fr. Syst. Myc. ii. 564. Sacc. Syll. ii. 436.

Pycnidia subcuticular, amphigenous, but mainly epiphyllous, scattered, roundish, flat, then convex, at length rugose and somewhat collapsed, smooth, shining, black, about 120–200 μ diam., opening by a central pore. Spores cylindrical, straight, $2–2\frac{1}{2} \times \frac{3}{4}–1\ \mu$; sporophores linear filiform, longer than the spores. (Tab. 550. f. 11.)

On dead leaves and petioles of *Hedera Helix*. West Kilbride, Ayrshire (Boyd), Dec. 1917.

The spermogone of *Hypoderma Hederæ* De Not., which accompanied it. The pycnidia are at first smaller and occur on the upper side, without the ascophorous stage and often sporeless, but afterwards are found on the pallid spots occupied by the latter on both sides of the leaf. This species belongs to Diedicke's § B, as does *L. virgultorum* (the spermogone of *Hypoderma virgultorum* DC.), and like all the other allied species it lies between the cuticle and the epidermal cells.

287. **Melasmia Urticæ**, sp. n.

Pycnidiis convexis, ca. ½ mm. long., atris, nitidulis, in series longitudinales digestis, stromati atro interrupto caulem plures uncias ambienti immersis, tandem poro irregulari v. rima flexuosa brevi apertis. Conidiis linearibus, utrinque præsertim basi attenuatis, sæpe flexis, curvatis, v. irregularibus, valde nubilosis, granulosis guttulatisque, $22–28 \times 3–4\frac{1}{2}\ \mu$, sporophoris erectis, confertis, linearibus, dilutissime rufo-brunneolis, spora brevioribus, e strato cellulari atro-brunneo oriundis suffultis. (Tab. 550. f. 10.)

Hab. in caulibus emortuis fragilibus *Urticæ dioicæ*, Stevenston, Ayrshire (Boyd), Febr. Mart., socio *Rhytismate Urticæ*.

This is rather different from the other Melasmias, since it does not dehisce by such elongated fissures, and the spores are very different, both in shape and size. If it were not an Imperfect Fungus, it would deserve to be placed in a separate genus, especially as *Rhytisma Urticæ*, of which it appears to be the pycnidial stage, is itself different from the other Rhytismas.

288. HETEROPATELLA UMBILICATA Grove.

H. lacera f. *umbilicata* Sacc. Syll. iii. 671.

Pycnidia erumpent, then superficial, scattered, lens-shaped, at length patelliform, up to ½ mm. diam., coriaceous, somewhat smooth, black; disc concave, dingy reddish. Spores fusoid-falcate, acute at both ends, guttulate, $22–25 \times 3–3\frac{1}{2}\ \mu$; sporophores short, branched. (Tab. 550. fig. 9.)

On dead stems of herbaceous plants. Not common. The pycnidium of *Heterosphæria Patella*, in company with which it is found. It is said that sometimes the pycnospores and the ascospores may be seen on the same disc.

289. SPORONEMA STROBILINUM Desm. var. ACCEDENS Sacc. Syll. iii. 679.

Pycnidia minute (up to 250 μ diam.), gregarious, subglobose, erumpent, black, fragile, soon vanishing above and leaving an excipuliform disc which is surrounded by the laciniæ of the epidermis, sometimes confluent; disc black when dry, but when moist swollen and opalescent-grey from the mass of spores. Spores cylindric-oblong, rounded at each end, rarely subfusoid or subclavate, about 7–8 × $1\frac{1}{2}$–2 μ, rather variable; sporophores crowded, long (up to 20 μ), straight, filiform, simple or occasionally branched. (Tab. 550. f. 8 *a*.)

On the apophysis of the cone-scales of *Pinus sylvestris*. Wood End, Tanworth-in-Arden (Dr. Bayliss Elliott). June.

When kept moist, the spores ooze out in a coarse tendril or a shapeless grey mass. On account of the vast number of spores, there is reason to believe that the same sporophore can continue to produce fresh ones after the first has fallen off. In the typical form the spores become ultimately pseudo-uniseptate, but no trace of this could be seen in the variety, the spores of which are really very different in shape from those of the type, although in other respects the two plants are similar.

290. GLŒOSPORIUM ROBERGEI Desm. in Ann. Sci. Nat. 1853, xx. 214. Sacc. Syll. iii. 712; Fung. Ital. pl. 1049.

Spots sinuous or roundish, pale-umber, subochraceous in the centre, without any distinct border line, 3–5 mm. across. Pustules hypophyllous, subcuticular, situated chiefly on the paler part of the spot, rather crowded, 100–125 μ diam., blackish, prominent, surrounded at length by the laciniæ of the cuticle. Conidia oval or obovoid, rounded at both ends, guttulate and granular within, at length appearing thick-walled, 13–15 × 7–8 μ; sporophores short.

On fading leaves of *Carpinus Betulus*. Stewarton, Ayrshire (Boyd). July.

The pustules are not covered by the epidermis, but only by the cuticle, which is darkened in colour and at length punctuated by the pressure of the apex of the spores.

291. **Glœosporium salsum**, sp. n.

Maculis nullis v. obsoletis. Acervulis amphigenis, sparsis, melleis, dein nigrescentibus, prominulis, usque 150 μ diam. Conidiis copiosissimis, elliptico-oblongis, utrinque rotundatis, sæpe biguttulatis, subinde curvulis, coacervatis dilute roseolis, 3–5 × 1–$1\frac{1}{4}$ μ.

Hab. in foliis vivis *Cochleariæ officinalis*, West Kilbride, Ayrshire (Boyd). Oct.

The spores at length ooze out and form little pallid-rosy masses above the opening of the pustule.

292. MYXOSPORIUM CARNEUM Lib. exs. no. 882. Sacc. Syll. iii. 726; Fung. Ital. t. 1076.

Pustules covered by the periderm, then erumpent, pulvinate, somewhat rose-coloured, rather large, at length surrounded by the laciniæ. Spores fusoid, obtuse at both ends, sometimes inequilateral, biguttulate, hyaline, 15–17 × 3½–4½ μ; sporophores acicular, thickened downwards, 15 × 2½–3 μ.

Var. Carpini, v. nov. Sporulis oblongo-ellipsoideis, apice rotundatis, 13–20 × 4½–6 μ. (Tab. 550. f. 13.)

Hab. in ramulis adhuc viventibus *Carpini Betuli*, prope Tanworth-in-Arden (Dr. Bayliss Elliott). Feb.

This variety is connected with the type (which has not yet been found in Britain) by Karsten's variety *sticticum*, on Ash in Finland; Libert's specimens were on Beech in the Ardennes. The chief mark of the species lies in the tendrils, which in the Tanworth examples were exactly of the normal tint of the human skin in these islands. They were accompanied, on the same branches, by *Melanconium stromaticum* Cord. The spores were faintly curved, in profile, with dense protoplasm and rarely two or three large guttules, singly colourless, but issuing as flesh-coloured tendrils; sporophores densely crowded, somewhat subulate, about as long as the spore, reaching 2 μ thick at the base, rising from a thick olivaceous stratum.

(To be continued.)

ERYTHRÆA SCILLOIDES IN PEMBROKESHIRE.

By A. J. Wilmott, F.L.S.

On September 4 last I received from Mr. J. E. Arnett, of Tenby, an *Erythræa* to name from "N. Pembrokeshire (Precelly) district, . . . growing in clumps on dry ground overlying shale or slate on face of hill side." Examination showed that it was the plant commonly known as *E. diffusa* Woods. This species occurs on the coasts of the Azores, Portugal, N.W. Spain (Corunna), Brittany and Normandy, being local everywhere. As it seemed possible that it might be really wild in Pembrokeshire, I wrote for more specimens and further information. Mr. Arnett replied that he hoped to be able to go and see it for himself. "Unfortunately the place is very remote . . . . The friend [Mr. J. B. Rhys] who brought me the specimen says it grows quite a mile away from any habitation on a bank adjoining the coast, but of course this is hardly sufficient evidence of its being truly wild . . . . I think, however, I may be in the district next week and then shall try to reach the spot in question." On September 24th I received further specimens, which in spite of bad storms Mr. Arnett had managed to find: "I was for three hours on the wild coast two miles away from anywhere and anything in the way of shelter in heavy rain and half a gale of wind. However, I found the plant in abundance undoubtedly wild, covering in patches a space of some three or four yards on the edge of cliff." As this habitat is quite natural for the species, and the place so remote, it seems probable that the plant may be really native there. Whether it has occurred there long, easily overlooked and in a remote place, or whether brought from Brittany by wild fowl, etc., cannot yet be inferred: knowledge of the means and methods of plant distribution is at present meagre.

A remarkable fact is that Nyman (Conspect. 502: 1881) states that the species occurs in Britain, while Rouy, Fl. France, x. 245 (1908), perhaps following him, remarks "Aire géogr.—Grande-Bretagne . . ." I have not so far discovered whether either had seen a specimen. Perhaps it may be found in some old British collections. Le Jolis (in Mem. Soc. Sci. Nat. Cherbourg, xxx. 66: 1896), in the course of a comprehensive historical account of the species, when considering its distribution, remarks: "Les données de la Géographie botanique pourraient faire soupçonner sa présence à la pointe de la Cornouaille anglaise et au sud de l'Irlande; peut-être la plante y existe-t-elle, mais aura été négligée (overlooked) par les botanistes anglais, uniquement parcequ'elle ne figure pas dans les flores anglaises. Pareille chose était arrivée en France, où pendant si longtemps elle a été negligemment foulée aux pieds en Bretagne et dans la Hague." Pembrokeshire, on cliffs facing west, should be quite a suitable habitat also, and it may turn up in other places now that attention has been drawn to it.

The following is an account of the plant:—

ERYTHRÆA SCILLOIDES Chaubard (MSS. in herb.) ex Puel in Bull. Soc. Bot. France, vii. 502 (1860); Willkomm in Willk. et Lange, Prodr. Fl. Hisp. ii. 664 (1870); Corbière, Fl. Normand. 394 (1894).

Gentiana scilloides L. fil. Suppl. 175 (1781), nomen diu dubium, nunc (*fide* Puel, *l. c.* 1860) ex specim. authent. in Hb. Mus. Paris, a Massoni lect. bene compertum.

Gentiana portensis Brotero, Fl. Lusit. i. 278 (1804).

Erythræa portensis Hoffmannsegg et Link, Fl. Port. i. 351 (1809); Grisebach, Gen. et Sp. Gent. 144 (1839) incl. *E. diffusa*, l. c.; Rouy, Fl. France, x. 244 (1908).

E. diffusa Woods in Comp. Bot. Mag. ii. 274 (1836 vel potius 1837, *cf. ibid.* p. 337)!; Hooker in Ann. Nat. Hist. i. 437 (1838); Le Jolis in Mem. Soc. Acad. Cherbourg, v. 267 (1847) et in Ann. Sc. Nat. ser. 3, vii. 217 (1847) et in Mem. Soc. Sci. Nat. Cherbourg, xxx. 55–70 (1896).

E. Massoni Sweet, Hort. Brit. ed. 2, 363 (1830); H. C. Watson in Lond. Journ. Bot. iii. 595 (1844).

Figures:—Hoffmannsegg et Link, Fl. Port. t. 66 (1809), of a weak elongated specimen; Ann. Nat. Hist. i. t. 16 (1838) as *E. diffusa*, sterile branches not shown; Le Jolis in Ann. Sc. Nat. ser. 3, vii. t. 13 (1847) as *E. diffusa*, good.

Exsiccata:—Schultz, Herb. Norm. 720; Soc. Dauph. 2548, Reliq. Maill, as *E. diffusa*; Lange, Eur. merid. ann. 1851–52, 320, as *E. portensis*; Fl. Lusit. Soc. Brot. 236, Wittrock, Erythr. exsicc. 48, as *E. scilloides*.

Perennial; glabrous. *Stems* prostrate or diffuse at base, branches of two kinds; some sterile, prostrate, very leafy; *leaves* elliptical to subrotund, subspathulate, rounded obtuse, subpetiolate small (4–12 × 4–8 mm.), approximate (longer than the internodes) not rosulate (1–) 3 veined; other branches erect (10–30 cm.) flowering, with few distant pairs of leaves; leaves rather narrowly elliptical obtuse (10×6–2 mm.), much shorter than the internodes, upper ones narrower. *Cymes* terminal, usually few (2–3) flowered, sometimes much more floriferous, terminal flower rather long pedicelled, laterals sessile. *Bracts* subulate. *Flowers* large, rose (or white), 15–20 mm. diam. *Calyx* slender, sublinear, c. $7\frac{1}{2}$ mm. long, segments linear lanceolate or subulate, appressed. *Corolla* tube white, at opening about equalling or slightly shorter than the calyx, usually lengthening rapidly to very long and c. $1\frac{1}{4}$ times the calyx and very slender; lobes elliptical, acute to obtuse. *Stamens* inserted at the top of the tube. *Capsule* much (c. $1\frac{3}{4}$) longer than the calyx, very narrow and attenuate above.

N. Pembrokeshire: grassy bank by the coast near Newport, with *Armeria*, *Calluna*, *Plantago Coronopus*, etc. N. France: Normandy, Brittany; N.W. Spain; Portugal; Azores. Heaths, furze-heaths, "often among tufts of *Ulex Gallii*," waste land, hedgerows, roadsides, footpaths, hill-slopes, cliffs, vineyards; mostly near the coast.

The perennial habit without a rosette and with sterile leafy shoots cut this completely off from any of our other British Erythræas.

It is not safe at present to consider its origin in Pembrokeshire at all definitely. Masson's plant was grown at Kew, and is found in lists of garden plants, but, so far as I am aware, is very uncommon in this country. It seems probable that it would be more difficult for it to be spread from a garden to so natural a habitat than to arrive direct from one of its other natural habitats: possibly wild sea-fowl carry it, or perhaps wind, as the seeds are so small. If this small area should prove to be its only occurrence in this country, we may have to do with a case of the recent arrival of an "Atlantic" species, for all such must at some time have made a first invasion. On the other hand, should it be found to be more widely spread in small isolated areas, it would be more reasonable to suppose it a relic. In either case, its discovery in Pembrokeshire is of great interest, and it is to be hoped that Mr. Arnett may be able to continue the working of this neglected district.

JOSEPH ANDREWS AND HIS HERBARIUM.

(Continued from p. 298.)

II. The Herbarium.

By G. S. Boulger, F.L.S.

Trifolium striatum L. *Cornard and on the Tumuli in Sharford Meadow, June 13, 1745. The earliest Essex record is Blackstone's in 1746 for Langdon Hills: in August, 1737 Blackstone was living at Maiden Ash, near Ongar (see Fl. Middlesex, 390].

T. scabrum L. St. Gregory's Croft [Sudbury]. June 10, 1745. [Recorded for Suffolk on the authority of Ray (R. Syn. ed. 1, 134–5; name corrected ed. 2, 194).]

T. SQUAMOSUM L. I gathered it by the Thames side near the Earl of Peterborough's Palace in company with Mr. John Field where the Sagitta minima grows. [This species, *T. stellatum glabrum* Ger. em. 1208, though recorded (R. Syn. ed. 3, 329) for Leigh and Little Holland in Essex, has apparently not been noted for Middlesex. It is unfortunate that this entry is undated; but it is probably earlier than 1721. The narrow-leaved form of *Sagittaria* was first noticed by Plukenet (*Almagestum*, 326); "On the Thames-Shore by Lambeth Bridge, over against the Archbishop of Canterbury's Palace, and plentifully before the Earl of Peterborough's House above the Horse-Ferry on Westminster Side, before the Gaining on the Thames for an Enlargement to the Courtyard; and I never observed it elsewhere." It is figured by Petiver (Herb. Brit. Cat., 1713, tab. 43). The palace built by the first Earl of Peterborough in Charles I.'s time, described by Stow and shown in Hollar's map of 1708, was at Millbank, being on the site of the Abbey water-mill, at the end of College Street. It was taken down in 1809.]

T. SUBTERRANEUM L. *Great Cornard. May 7, 1745.

T. GLOMERATUM L. Greenwhich Park . . where Flamsted's House stands. It grows plentifully about the Park. [In Ray Syn. ed. 3, 329. 10, Doody is quoted as having found it "About Blackheath."]

T. FRAGIFERUM L. *Friar's Meadow [Suff.] by River side. Aug. 6, 1740.

T. FILIFORME L. Barber Heath.

TRIGONELLA ORNITHOPODIOIDES DC. Between Sudbury and Lakenham, May 21, 1727. [In Dale's herbarium is a ticket (see Journ. Bot. 1883, 196): "Fœnum græcum humile repens, Ornithopodii siliquis brevibus erectis Raii Synop. iii. 331 . . . Mr. Jos. Andrews gave me this specimen who found it. Mr. Newton, in company with Mr. Ray and myself, show'd it us on a sandy bank at Tollesbury, Essex." As Ray records the Tollesbury locality in Gibson's Camden (1695); but not this one of Andrews's, it was probably after 1727 that Dale wrote this label, or part of it.]

LOTUS CORNICULATUS L. *crassifolius* Pers. Between Yarmouth Town and fort plentifully. Aug. 1725.

L. ULIGINOSUS Schkuhr. *Kingsbury Mere, Cornard, Aug. 26, 1743.

ANTHYLLIS VULNERARIA L. *Kittingdon hills [Suff.] August, 1743.

VICIA SEPIUM L. Ballingdon Hall Grove. July 4, 1744.

V. SATIVA L. An 5 Vicia sylvestris flore ruberrimo-siliqua longa nigra R. S. 3. 321. Bulmer and Ballingdon. May 10, 1745. [The plant is *V. sativa* L., though the suggested name is that of *V. angustifolia* L. var. *Bobartii* Forst.]

V. LATHYROIDES L. *Vicia minima præcox Parisiensium* R. S. 3. 321. 7. I gathered it in field on the right hand on a bank next the road as you go from Ballingdon up the first hill. May 4, 1750. [Of this plant Dillenius writes (R. Syn. iii. 321. 7) "Forte Pusillum Pisum aliud sylvestre spontaneum Lob. Illustr. 164. Found by Mr. J. Sherard and Mr. Rand on the Chalky banks near Green-hithe in Kent. Eodem loco & trans Thamesin etiam in Essexiæ campis elatioribus se reperisse Lobelius scribit, si modo eandem intelligat plantam." Gibson seems to have overlooked this record of 1655, and writes of *V. lathyroides* that it "is only suspected to occur in Essex" (*Flora of Essex*, p. 85). As the species is represented in the National Herbarium from both Suffolk and Middlesex it was natural to suspect its occurrence in Essex.]

LATHYRUS NISSOLIA L. Ballingdon Hills, 8 June, 1743. [Recorded by Ray (Cat. Pl. Angl. 1670) from Black Notley.]

L. PRATENSIS L. *Between Sudbury and Cornard. July 19, 1751.

L. SYLVESTRIS L. *Sudbury.

L. PALUSTRIS L. I gathered it in Peckham field, on the back of Southwark. [This is *Lathyrus viciæformis, seu vicia Lathyroides nostras*, Chichling Vetch of R. Syn. ed. 3, 320; and the locality is Willisel's. Hill writes of the species (Brit. Herbal, 1756, 282) as occurring "in the neighbourhood of London."]

L. MONTANUS Bernhardi. Pasture by Kane wood by Hampstead Heath and a wood betw. Dulwhich and the Wells. [Recorded for Hampstead by Gerard 1057 and Johnson, Ger. em. 1237, as *Astragalus sylvaticus.*]

HIPPOCREPIS COMOSA L. Castle-yard, Thetford, Norfolk.

ONOBRYCHIS VICIÆFOLIA Scopoli. Linton, Aug. 1, 1745, and on Barktlow Hills. [These two localities, one in Cambridgeshire and the other in Essex, are close together. Babington says that the species "Common throughout the chalk-district," was "formerly much more abundant"; and Gibson that it "is often cultivated, but appears to be a native plant in chalky districts." It was growing at Bartlow in 1883; but seems of late to have been largely replaced as a fodder crop by *Trifolium incarnatum.*]

PRUNUS INSITITIA L. R. S. 3. 462. 2. Black Bullace [and] *fructu majore albo* R. S. 3. 462. Ballingdon, 13 July, 1744.

P. DOMESTICA L. *An* 4. *Prunus sylvestris fructu rubro acerbo et ingrato* R. S. 3. 463. Gallow Hill towards Chilton, Aug. 21, 1744. [Ray says (Syn. ed. 2, 302) "This has been observed by Mr. Dale in some Hedges both in Essex and Suffolk"; but Dr. Hind gives no record earlier than Sir J. Cullum, 1773. All three forms are probably only remains of more or less ancient cultivation.]

SPIRÆA FILIPENDULA L. Kiltington Hills, July 12, 1745.

ALCHEMILLA VULGARIS L. Brunden hall, May 2, 1743. [Apparently *A. minor* Hudson.]

POTENTILLA ARGENTEA L. Brunden Lane End, 1750 & 1758.

P. VERNA L. *Gogmagog Hills, May 1, 1744.

RUBUS IDÆUS L. *fructu rubro.* R. S. 3. 467. Link Hills, Maplested. 12 Aug. 1748. [Gibson's first Essex record is Edward Forster. The red-fruited form is, perhaps, more likely to be a bird-borne escape from cultivation than the white-fruited form collected by Rev. G. F. Raynor at South Weald in 1884.]

GEUM RIVALE L. Great Cornard.

ROSA SPINOSISSIMA L. Bulmur Church Yard [Essex], May 28, 1753. [Previously recorded for S. Essex by Gerard, p. 1088.]

R. VILLOSA L. *Rosa sylvestris pomifera major nostras* R. S. 2. 297. A Mr. Dale who gathered it near Tilbury fort. [Probably not wild.]

R. ARVENSIS Hudson. Rosa sylvestris altera minor, flore albo nostras. R. Syn. ed. 2, 297, ed. 3. 455, 4. *Gestingthorpe [Essex], 7 July, 1744.

PYRUS AUCUPARIA Ehrhart. *Ornus* Park. 1419. R. S. 3. 452. 2. *Rickland Wood, Lavenham, 1731.

P. TORMINALIS Ehrhart. R. S. ed. 3. 452. 2. Liston Hall Orchard, 30 July, 1744.

PEPLIS PORTULA L. Between Assington & Stoke. [Suff.] Aug. 1745.

EPILOBIUM MONTANUM L. *Lysimachia campestris* Ger. 387. Ger. em. 478. R. Syn. ed. 3, 311. 4. *Bulmur, 1757.

E. PALUSTRE L. *Lysimachia siliquosa glabra minor angustifolia* Ger. emac. 479. R. Syn. ed. 3. 311. 6. Cornard Mere.

SEDUM TELEPHIUM L. Brakey Hill, Bulmur.

SAXIFRAGA GRANULATA L. Great Cornard Churchyard.

PARNASSIA PALUSTRIS L. Cornard Mere. [The southern stations for this species, successively disappearing as the result of drainage operations, such as Boxmoor, Herts, and Beeston bog, near Sherringare particularly worthy of record.]

MYRIOPHYLLUM VERTICILLATUM L. *Pentapterophyllum aquaticum flosculis adfoliorum nodos* R. S. ed. 3. 316. Great Cornard, 12 June, 1744. [The earliest Suffolk record is Ray's in Syn. ed. 2.]

M. SPICATUM L. An. 17. *Potamogeton foliis pinnatis* R. S. ed. 3. 150. At Milden in a pond towards Little Waldingfield. 16 July, 1745.

HYDROCOTYLE VULGARIS L. *An Alsine spuria pusilla repens foliis Saxifragæ aureæ* R. S. ed. 3. 352. Pluk. Alm. 23. Tab. 7, fig. 6. be any other than a very small Plant of the common *Hydrocotyle* of the Synopsis p. 222. which the great Mr. Ray being convinced of might been the reason he left it out in his History of Plants. [Plukenet (*loc. cit.*) writes "miratus sum, quo casu in Cl. Autoris Hist. Pl. Universal. hæc plantula omissa fuit;" but his own specimen (Herb. Sloane 84. 13) shows Ray and Andrews to be right. It is nothing but *Hydrocotyle vulgaris.*]

APIUM INUNDATUM H. G. Reichenb. *Cornard Mere, 22 July, 1745.

TRINIA GLAUCA H. G. L. Reichenb. *Peucedanum minus* R. Syn. ed. 3. 217. [A specimen collected by Dale on St. Vincent's Rocks in May, 1731.]

CARUM MAJUS Britten and Rendle. *Bulbocastanum majus* Ger. em. 1069. R. Syn. 3. 209. *In a Lay by Stoke Maudlin Wood, Chilton [Suff.], 14 June, 1745.

BUPLEURUM ROTUNDIFOLIUM L. Waltam in Essex. [It is recorded from Notley by the Forsters in Gough's Camden, 1789.]

ŒNANTHE FISTULOSA L. *Cornard Mere, 20 July, 1739.

SMYRNIUM OLUSATRUM L. *Clare Castle, 26 April, 1746.

SAMBUCUS NIGRA L. *baccis albis.* Between Wickham Windmill & the White Post, Gestingthorpe.

Viburnum Lantana L. Wrongly labell'd *Mespilus Alni fol. subtus incanis Aria Theophrasti dicta* [i. e. *Pyrus Aria* L.] in John Goodin's garden in Burkett's Lane [Sudbury], 2 May, 1759. [Hind's first Suffolk record, Sir J. Cullum 1773.]

Galium Cruciàta Scop. *Bone Bridge, Halsted, Essex, 19 May, 1748. [No other Essex record before Gibson's *Flora*, 1862.]

G. tricorne Stokes. 2. *Aparine semine læviore* R. Syn. 2. 118 ; 3. 225. *I gathered it amongst Corn in the five-acred field belonging to the Farm on Armpe in Bulmur Essex.

G. uliginosum L. *Cornard Mere, 28 Aug. 1746. *G. palustre* L.

Rubia peregrina L. St. Vincent's Rocks, Gloucestershire, 28 May, 1731. [A duplicate of Dale's, with his ticket.]

Valeriana officinalis L. *V. sylvestris major montana C. B.* R. S. 3. 200. 2. Smoak hall wood near Bath, 28th May, 1731.

Valerianella olitoria Pollich. *Gravel pit, Small Bridge, Wormingford Mill, 21 June, 1743.

V. rimosa Bastard. *V. vulg. spec. major serotina* R. S. 3. 201. 3. Given me by Mr. Dale who gathered it in Kent & called it *Valerianella serotina foliis angustis integris*. [Dale's localities are given by Ray (*loc. cit.*) as "In the Corn Fields between Ore and the Foot Ferry to Shepey Isle in Kent. Also in the third or fourth Field on the right Hand of the Road going from London-Coney towards St. Albans in Hertfordshire." This plant was referred to Bastard's *V. rimosa* by Joseph Woods in *English Botany Supplement*.]

Scabiosa Succisa L. Colledge Wood, Middleton, 15 Aug. 1745.

Petasites hybridus G. M. & S. *Petasites major, floribus pediculis longis insidentibus* R. S. 3. 179. 2. Brunden Mill Banks, 1743. [This is the form with long pedicels figured as *Tussilago hybrida* in *English Botany*, 430. and admitted to be a mere variety in Smith's *English Flora*, iii. 427–8.]

Aster Tripolium L. *Aster maritimus cæruleus.* Mersey Island. [First recorded for Essex by Gerard (1597) 333 from "Lee and Harwich."]

Erigeron acris L. *Aster arvensis cæruleus acris* R. S. 3. 175. Ballingdon Hall, Essex.

Inula squarrosa Bernhardi. *Cornard Heath. 14 July, 1749 and Bulmer Tye. [First Essex record, Gerard, 391 (1597).]

I. crithmoides L. *Aster maritimus flavus.* Crithmum Chrysanthemum dictus. R. Syn. i. 49 ; ii. 79 ; iii. 174. Maldon.

Filago minima Fries. R. S. 3. 181. 4. Kittington hills, Cornard.

F. gallica L. *Gnaphalium parvum ramosissimum foliis angustissimis polyspermon* R. S. 3. 181. 5. Kittington hills, Cornard.

Achillea Ptarmica L. *In Mr. Denny Cole's Meadow [Suff.], 8 July, 1744.

Matricaria inodora L. *Chamæmelum magis folio tenuissimo, caule rubente* R. S. 3. 186. *Kittington Hills amongst wheat [Suff.], 12 July, 1745.

Chrysanthemum segetum L. *An 2 Chrysanthemum segetum nostras folio glauco multiscisso majus, flore minore.* Amongst Rye and Oats. Stoke by Nayland. - 10 July, 1744. [Though the leaves are pinnatifid, the plant is *C. segetum* L., *i. e.* 1 in R. S. 3., and not 2., which is Plukenet's Glastonbury plant with smaller flower-heads, which Smith (Engl. Flora iii. 451) says no one else has found.]

ARTEMISIA VULGARIS L. Mugwort. Sible Hedingham, Aug. 1746.

A. MARITIMA L. *Absinthium marinum album* Ger. 940. Abs. *Seriphium Belgicum* J. B. Mersey Island. [The type.]

A. MARITIMA β. Sm. *Absinthium maritimum Seriphio Belgico simile, latiore folio, odoris grati* D. Plukenet. R. S. 3. 188. 3. [There is a specimen of this, collected by Dale, on Mersey Island, in Herb. Sloane 54. 97.]

A. GALLICA Willd. ? *Absinthium Seriphium Gallicum* C. B. R. S. 3. 189. 4. [There is a specimen of this, collected by Dale at Harwich in Herb. Sloane 54. 98. Ray's comments (Syn. 3. 189) are worth reproducing :—

"Absinthii maritimi latiore folio speciem quondam in insula Merseia prope Colcestriam invenit D. Dale. An Plukenetianæ prædictæ eadem sit, an potius Absinthio Seriphio Gallico *C. B.* i. e. Seriphio Narbonensi *Park*- Seriphio tenuifolio maritimo Narbonensi J. B. dubitat. Ex sententia D. Dale eadem est cum Absinthio Seriphio Germanico C. B. Pin. 139 . . . An autem a vulgari maritimo specie differat, merito dubium videtur. In Absinthio sane maritimo maxima est varietas," . . . .]

A SALINA Willd. ? *Absinthium Seriphium* tenuifol. marin. Narbonensi J. B. iii. 177. R. S. 3. 189. 5. Mersey. [This is apparently the form said by Dillenius (*loc. cit.*) to have been "found by Mr. Dale at Harwich, on the Marsh-banks on the West side of the Town, and in Mersey Island." Smith (Engl. Flora, iii. 408–9) makes the preceding form, *A. maritima* γ and identifies this with *A. gallica* Willd. Newbould, in Gibson's *Flora* says :—"These plants may be good species, as Smith on reconsideration, believed. Dale, one of the most accurate early British botanists, distinguished three." Babington makes *gallica* a variety of *maritima* ; Hooker's *Student's Flora* dismisses the subject with the opinion that *gallica* "is not distinguishable as a well-marked variety, either by its more compact habit or erect heads."]

SENECIO VISCOSUS L. *S. hirsutus viscidus major odoratus* R. S. 3. 178. 2. *Assington. 14 July, 1749. [Suff.]

S. JACOBÆA L. *Jacobæa vulgaris flore nuda* from Stoke Maudlin Wood, Chilton, 1743 [seems only an impoverished *Jacobæa.*]

S. AQUATICUS Hudson. *King's Marsh, 4 July, 1744. [Suff.]

S. INTEGRIFOLIUS Clairv. *Jacobæa Pannonica folio non laciniato* R. Syn. 3. 178. 4. Gogmagogs. 28 June, 1722.

BIDENS TRIPARTITA L. *Verbesina seu Cannabina aquatica flore minus pulchre, elatior & magis frequens.* R. S. 3. 187. 1. *Ballingdon Limekiln [Essex]. Aug. 1743.

B. CERNUA L. R. S. 3. 187. 2. *On the Common by the River side. Aug. 1743.

B. MINIMA L. 3. *Verbesina minima* R. S. 3. 188. 3. In a Boggy meadow behind Box Mill at Halstead in Essex with the second [*B. cernua*] plentifully—I take them to come both from the same seed, the *minima* growing as thick & close as possible together, the 2nd at larger distances so have more room to spread. Aug. 23, 1743. [Smith (Engl. Flora), iii. 400 makes *minima* var. γ; but adds that it "is certainly nothing more than a starved plant of this species, growing out of water. The flower is drooping in my specimen from Miller's herbarium, though drawn erect by Dillenius." The interesting series of experiments carried out by Dr. H. B. Guppy in 1890–3 (see *Studies in Seeds and Fruits*, pp. 480–2 (1912)) give good reason for thinking *B. tripartita* merely the form of drier habitats specifically undistinguishable from the more aquatic *B. cernua*.]

Carlina vulgaris L. *In Ballingdon Limekiln yard, 23 July, 1739.

Centaurea nigra L. *Jacea nigra cum foliis laciniatis* R. S. 3. 199. Cornard Common, 14 Aug. 1749. [This cut-leaved form was recorded by Richardson, from Malton, Yorkshire, in R. Syn. 3. 199.]

C. Scabiosa L. *Jacea major flore albo.* Windmill field, Sudbury. 31 July, 1746.

C. solstitialis L. *Carduus stellatus luteus foliis Cyani.* R. S. 3. 196. 16. *On Bulmur Tye. [Evidently, as Gibson says, introduced with Lucerne and other seed; but not uncommon as a casual, more especially in North Essex, from Andrews's time to the present.]

Carduus nutans L. *In the croft by St. Gregorie's Church, Sudbury. 7 Aug. 1747.

C. eriophorus L. *Field joyning to Stoke Maudlin Wood. July, 1743.

C. pratensis Hudson. *Milford near the paper mills. 19 June, 1752.

C. acaulis L. Chilton hall Park. [Suff.] 9 Aug. 1739.

Arnoseris minima Sch. & K. *Hieracium minimum Clusii Hyoseris Tabernæmontani et Gerardi.* R. S. 3. 173. *Lamarsh in a field of Rye. 28 May, 1745.

Cichorium Intybus L. *C. sylvestre* R. S. 3. 172 *flore albo.* Nr. Edwardstone Church, 28 August, 1746.

Hypochœris maculata L. Gogmagogs. 28 June, 1722.

Thrincia nudicaulis Britten. *Hieracium pumilum saxatile asperum præmorsa radice* R. S. 3. 167. 16. Putney Heath, June 1711.

Tragopogon porrifolius L. *T. purpureum* R. S. 3. 171. From Mr. Richard Cook's at Halsted in Essex. 29 May, 1745.

Picris hieracioides L. An 15 *Hieracium asperum majore flore in agrorum limitibus* J. B. ii. 1029. R. S. 3. 167. Ballingdon Hills.

Lactuca virosa L. 1 *L. sylv. major odore Opii.* R. S. 3. 161. Cornard. July, 1738.

L. muralis Gaertner. 5. L. sylv. murorum flore luteo. R. S. 3. 162. *Cornard. 18 June, 1744.

Sonchus palustris L. From the late Mr. John Field of London, Apothecary, Bell, in Newgate Street.

Hieracium vulgatum Fries. College Wood, Middleton & Brickle Woods, Bulmur, 11 July, 1746. [Inaccurately labelled by Hemsted *H. murorum.*]

H. boreale Fries. *H. fruticosum latifolium hirsutum.* R. S. 3. 167. 1. College Wood, 29 July, 1743. [*H. sabaudum* Smith in *English Botany.*]

H. umbellatum L. H. fruticosum angustifolium majus. R. S. 3. 168. 3. *Link Hills, Maplested.

Campanula glomerata L. *By the roadside about half a mile before come to Linton from Haverhill & elsewhere plentifully. 1 Aug. 1745.

Calluna vulgaris Hull. Beyond Caddle Cross towards Halstead, Essex. 25 July, 1746.

Erica cinerea L. R. S. 3. 471. 3. Between Lovingland and Laystock.

Lysimachia thyrsiflora L. I gathered it in the late Mr. Dale's garden Braintree May 30, 1739, from whence I brought some Roots into my Garden. [This was a week before Dale's death.] My garden, 1757.

L. vulgaris L. On the banks behind Borley Mill, 10 Aug. 1744. By the Riverside in North Meadow . . and on Cornard Mere.

Glaux maritima L. Mersey Island.

Anagallis cærulea Sm. *In a field of oats . . between Milford & the first Brook towards Bury. 14 June, 1738.

Pinguicula vulgaris L. *In a Boggy pasture . . in Milford, as ride from the Paper Mills towards Hoop Lane. 12 May, 1746.

Utricularia vulgaris L. In the watery ditch on the right hand as soon as out of Hiney Street towards Middleton, 26 June, 1740. [The earliest Essex record for *U. vulgaris* L. is Blackstone's (1746), 45; but there is a specimen of *U. major* Keller from Thorndon, Essex, in Sir John Hill's herbarium; Edward Forster's specimen from Hoghill Pond, Hainault Forest, Varenne's from Kelvedon, and probably others of those recorded by Gibson under *U. vulgaris* are *U. major* Keller.

Blackstonia perfoliata Huds. Ballingdon Limekiln Yard, 6 July, 1744.

Gentiana Amarella L. Ballingdon Limekiln Yard, 1746. [The first Essex record is Dale's. from Belchamp St. Paul, four or five miles from Ballingdon, in R. Syn. 2 (1696). *Gentianella fugax Autumnalis elatior, Centaurii minoris foliis.*]

Nymphoides peltatum Britten and Rendle. *I gathered it in the river nr. Stretham Ferry, Isle of Ely in flower. 28 June, 1722.

Convolvulus Soldanella L. Mersey Island.

Cynoglossum officinale L. *Acton, nr. Sudbury. 27 May, 1748.

Myosotis arvensis Hill. *Myosotis scorpioides latifolia hirsuta* R. S. 3. 229. 2. I gathered it at Hartoft in Suffolk. 27 April, 1744. [This is apparently *M. arvensis* var. *umbrosa* Bab., as also is Dale's specimen of 1722, recorded (*l. c.*), from "between Redgwell and Batham-end in Essex," and by Gibson (*Flora*, p. 213), under *M. sylvatica* Ehrb.]

Atropa Belladonna L. In dead Lane on bank side North Street, 6 July, 1744.

Verbascum nigrum L. At Ballingdon Townsend, between Bontils Green and Brunden Lane, & below the Kitchin, Bulmur, & many other places. 29 July, 1746.

Antirrhinum Orontium L. *Ballingdon, 19 June, 1745.

Scrophularia nodosa L. *An.* 3. *Scrophularia Scorodonia* R. S. 3. 283. *In a moist ditch going up Kitchin hill Bulmur from Ballingdon, 14 June, 1758. [The suggested identification is erroneous. The plant is 2. *Scrophularia major* Ger. of Ray's *Synopsis*.]

Melampyrum cristatum L. In Gollingham Hall Lays Bulmur. [This distinctively East Anglian species, which replaces *M. pratense* L. in its area, was first recorded by Ray in his Cambridge *Catalogus* (1660). It is recorded for Bedfordshire, R. Syn. ed. 2 (1696). The specimen from Gestingthorpe, Essex, the next parish to Bulmur, in Dale's Herbarium is dated 1724.]

Veronica montana L. *Punts Wood Bulmur, or Gestingthorpe.

V. triphyllos L. *V. flosculis singularibus foliis laciniatis, erecta* R. S. 3. 280. 6. I found it in all the three Chapple fields in Ballingdon.

Mentha spicata L. *Mentha spicata glabra, latiore folio Dale.* R. S. 3. 234. *3. This mint I gathered in a little meadow adjoining to Marwood Bridge on the left hand as you go from Colchester to Mersey Island. In company with Mr. Dale. 16 Aug. 1722. [This form, *M. viridis* L. δ of Smith (Engl. Flora, iii. 76), first recorded by Dale (R. S. *l. c.*) is also represented in the Sherardian Herbarium by a specimen from him. The two preceding species—*M. angustifolia spicata, glabra, folio rugosiore, odore graviore* R. S. 3. 233. 1. and R. Syn. i. 79, "Found by Mr. Dale by Bocking River Side"; and *M. spicate angustifolia, glabra, spica latiore* Dale, R. S. 3. 233. 2, also from Bocking—are both forms of *M. spicata* L., β and γ of Smith. Buddle says he had the former "from Dale himself, who not only collected various mints, but very accurately distinguished them."]

(To be continued.)

SHORT NOTES.

Fertilization of Mistletoe. Since some notes on the method by which *Viscum album* is fertilized were given in this Journal for October 1916 (p. 292), various experiments have been made with a view to test the truth of the assertion that the plant is entomophilous. Mistletoe was stated by early writers to be anemophilous, but since 1762 when Kölreuter declared it to be entomophilous, this method of its pollination has been accepted. None of the writers on the subject, however, are clear as to what insects are the pollinators, and there seems to be a good deal of assumption in the matter. A simple way to test whether insects visited the plant at all seemed to be to place a barrier which they could not pass, and then to note whether fertilization took place in spite of the obstacle. Accordingly, early in 1917 some shoots of a female plant were enclosed in net bags of 2 mm. mesh. The bags were so arranged with small bamboo struts inside that the flower could not be reached by an insect from outside the cage. In spite of this obstacle the flowers were fertilized and produced berries, the seeds from which are now growing. Early this year (1918) as soon as the flower buds began to show, and about three weeks before they opened, several were again enclosed in these net bags, the sizes used being 2 mm. (to re-test last year's experiment) and a 1 mm. mesh. Fertilization was again obtained under the 2 mm. size, and also in the 1 mm. A piece of the coarser net being submitted to a well-known entomologist, he is confident that none of the insects suggested as pollinators by the German writers could by any means pass through it: it will follow that a mesh only half the size will form a still more effective barrier. If therefore the mistletoe is entomophilous, the insect visiting it must be able to pass through a hole 1 mm. in diameter and hence must be rather minute. Every care was taken in fixing the bags so that there might be no access to the flower except through the bars of the cage. It is hoped to re-test these experiments another year, but if they have been correctly carried out, they would appear to cast doubt on the statement, resting wholly on German authority, that *V. album* is entomophilous.—ETHELBERT HORNE.

PILULARIA GLOBULIFERA L. IN THE ISLE OF WIGHT. In the spring of the present year I noticed this plant carpeting a small heath-pool on Bouldnor Hill, near Yarmouth, the seaward side of which hill affords the unique exposure of the Hempstead Beds. In the autumn I have found it again in considerable abundance and in fruit in two other pools, apparently the remains of old clay-pits dug out for the brickworks, some distance away but on the same hill. It is curious that so distinct a plant is not recorded for the Isle of Wight, either in Townsend's *Flora of Hampshire* or in Morey's *Guide to the Natural History of the Isle of Wight.*—JAMES GROVES.

SAXIFRAGA DRUCEI IN CO. DONEGAL.—Mr. C. E. Salmon has sent for my opinion, three specimens collected in June 1886 by Henry M. Wallis on a cliff, 300 feet above the sea, near Torneady Head, Arran More, which clearly belong to this species. They have turned brown, in the course of years, and have more numerous glands than usual; this may be due partly to a more northern climate, and partly to a stony exposed situation. Mr. N. E. Brown had named them *S. cæspitosa* L., which is by no means a bad determination; but they differ from that in the shape (narrow, parallel-sided, acute) and clothing of the leaf-segments, the narrower subacute sepals, and the longer, rather narrower petals. This great extension of range is most satisfactory; I feel sure that *S. Drucei* will be found in other parts of Ireland, and expect it to occur on the Galtees, Co. Tipperary.—EDWARD S. MARSHALL.

EPILOBIUM HIRSUTUM × ROSEUM IN SURREY.—Mr. Salmon also forwards two pieces (evidently side-shoots) of a Willowherb found by him beside a pond near Newdigate (September 1916), with the remark:—"This seems to be a hybrid in which *E. hirsutum* plays a part." That is clearly correct; the clothing of the stem and foliage, and the relatively long petals ($\frac{1}{4}$ to $\frac{1}{3}$ inch), leave no room for doubt.

All the other characters point with equal certainty to *E. roseum* as being the second parent; notably the numerous small gland-tippes hairs on the shrunken shortened capsules, the frequently *pink* petals, and the patent, distinctly stalked, neat, oval leaves. I have often sought for the hybrid in W. Surrey, where these two species grow together not uncommonly, but without success. Dr. Drabble records it from Derbyshire; I have not seen a specimen. It appears to be very uncommon on the Continent; Prof. Haussknecht wrote to me that Schmalhausen's plant from Gostilizy, near Petersburg (1875), so named in the Monograph, p. 65, proved to be *E. hirsutum* × *parviflorum*; but that true *E. hirsutum* × *roseum* was found at Mühlhausen, near Jena, about the year 1886.—EDWARD S. MARSHALL.

REVIEW.

Plant Genetics. By JOHN M. COULTER and MERLE C. COULTER. 8vo, pp. ix, 214, with 40 text-diagrams. University of Chicago Press, July 1918. Price $1·50 net.

PROF. JOHN COULTER, the Head of the Department of Botany, Chicago University, is well known to English students as the joint author of a classic work on the Morphology of the Seed-plants; his co-author in the present work is Instructor in Plant Genetics in the same University. The aim of their book is to supply a general authoritative text which shall form an easy introduction to plant genetics. As stated on the temporary cover, to read the literature of this subject with understanding requires first an appreciation of the point of view and method of attack of the working geneticist, and secondly an acquaintance with certain classic investigations which are matters of common knowledge among geneticists. This volume provides these two things, and at the same time is easy reading for a student who has an elementary training in botany and the theories of evolution. There has been no attempt to give a complete presentation of modern genetics, and as a reference book it is admittedly inadequate, much representative material having been omitted and only enough bibliography given to put the student upon the trail. The authors have succeeded in giving a readable and connected account of a branch of biological study which is not an easy one, and in which moreover much must be taken for granted, partly no doubt because it is at present only in an early stage of development. At the same time they make it clear that there are great possibilities in its further development towards the understanding of the fundamental principles of evolution.

A short chapter is devoted to a discussion of earlier theories of heredity. Darwin's theory of pangenesis asserted that the individual cells and organs of the whole organism are represented in every germ-cell and bud by definite material particles. These multiply by division and at cell-division pass on from the mother-cells to the daughter-cells. This theory is in keeping with the present point of view, but failed to obtain acceptance owing to its association with the transportation hypothesis, which was an attempt to account for certain facts which seemed to indicate the inheritance of acquired characters. Similarly, Weismann's theory of germinal continuity, which is in general agreement with the results of biological work to-day, was hampered by association with the theory of germinal selection, devised in order to explain variation. In the following chapter the difficult question of the inheritance of acquired characters is discussed, the conclusion reached being that, whereas the bulk of available evidence seems to be against such inheritance, there are a number of biological facts that seem difficult to explain in any other way. In the six succeeding chapters Mendel's law and its modern development, or neo-Mendelism, are lucidly explained, and the authors have made good use of simple diagrams to illustrate the mechanism of the operations. The student will admire the ingenuity with which difficulties have been overcome by an increasing complication of the working machinery, but will be inclined to look forward with some foreboding to further developments. Two points of difficulty which arise are discussed in the chapters x. and xi.—namely, the possibilities of non-Mendelian inheritance and of modification of unit characters, both fundamental points on which there is difference of opinion. The remaining chapters deal with certain phenomena which are of special interest in the study of plant genetics. In a discussion on parthenogenesis and vegetative apogamy stress is laid on the want of observation and control of the events between pollination and fertilization, and fertilization and the subsequent escape of the embryo, and the desirability is emphasized of a study of the lower forms where the gametophyte is obvious and the effects of fertilization can be more readily followed. In this connection it may be remembered that an account of some extremely interesting work on the Mosses has been recently given at a meeting of our Linnean Society. Other matters treated are self-sterility, the endosperm in inheritance, involving an explanation of the phenomenon originally described as xenia, hybrid vigour, and sex-determination. The little volume will be welcomed by students and teachers of botany, who have felt the want of a satisfactory presentation of the present position of plant genetics.

A. B. R.

BOOK-NOTES, NEWS, ETC.

Workers in Cryptogamic botany, who have used the collections in that section of the Department of Botany at the Natural History Museum, will hear with regret of the death at his home in Fulham, on September 6, of William Robert Carver, who had been associated with the Department since its reorganization at South Kensington. He was born in Marylebone, Feb. 25, 1860, and joined the staff in 1880, as an Attendant when the collections were on the point of being transferred from the old building in Bloomsbury to their new home in Cromwell Road. Mr. George Murray was in charge of the Cryptogamic section, and Carver was his right-hand man in the arrangement of the collections and in the building up of the new Herbarium in its more commodious quarters. Until two years ago, when he was temporarily lent (under heavy pressure) to the Ministry of Munitions, Carver was closely identified with the Cryptogamic Herbarium and Library. He had an intimate working acquaintance with their contents and resources, and his knowledge was always at the service of students and enquirers, many of whom will gratefully recall his quiet, courteous and helpful demeanour. His devotion to his work and the increased value of his services to the Department, arising from the extensive knowledge he had acquired of systematic botany, especially of the Seaweeds, led to his promotion in 1912 to the post of Departmental Clerk, a post which was created specially for him. Both Mr. Murray and I were greatly helped in the routine necessarily associated with a government department by Carver's methodical ways; he was admirable at keeping records, and everything was always ready to hand at the right time; he would have made an excellent confidential clerk. It was a serious loss when he was transferred to the Ministry of Munitions—a loss of ripe experience and knowledge acquired through nearly forty years' steady conscientious devotion to his work.—A. B. R.

Claude Frederick Hugh Monro, who died at Weybridge on August 14th, at the age of fifty-five, was born in London. After being many years engaged in scholastic work, mainly at Margate, he went out to Rhodesia about 1900, where he worked for sixteen years in the Mines Department of the Chartered Company. Compelled to leave Africa by ill-health, he took up temporary work on the Indian Trade Enquiry at the Imperial Institute, which also he was soon compelled to relinquish. He gave collections of herbarium specimens to the Rhodesian Museum, Buluwayo, the South African Museum, and the Botanical Department of the British Museum; and he also sent seeds of Rhodesian plants to Kew. Monro wrote two lengthy papers in the *Proceedings of the Rhodesia Scientific Association*, one on the Grasses in Rhodesia (vol. vi. pp. 5–67 (1906), the other on the Trees of South Rhodesia (vol. viii. part ii. p. 123 (1908)), in both of which he devotes much care to the native names; he was engaged upon the revision of the latter paper at the time of his death. His name appears frequently in Mr. Eyles's list of Southern Rhodesian plants (Trans. R. S. South Africa, v. 273–564), and it has been commemorated by Mr. Moore in *Fockea Monroei* and other species described in this Journal.

In *The Lancashire and Cheshire Naturalist* for July, Mr. Harold J. Wheldon begins a "Fungus Flora of Lancashire," in which will be summed up all published matter on the subject with the observations of recent workers.

In the Report of the Ashmolean Natural History Society for 1917, Mr. Druce gives an interesting account of John Randolph (1749–1803) who successively occupied the sees of Oxford, Bangor, and London, and was rector of Ewelme, Oxon, from 1796 to 1799. During this period he annotated copiously an interleaved copy of Sibthorp's *Flora Oxoniensis*, entering the localities of the plants of the neighbourhood, with critical notes which show that he possessed a good knowledge of botany and of botanical literature. The volume fortunately fell into Mr. Druce's hands; Randolph's observations and records form a fairly complete Flora of Ewelme.

The members of the British Mycological Society held their annual Fungus Foray at Selby, Yorkshire, from the 9th to 14th

September. Byram Park, Escrick Woods, Parlington Park, and Staynor Wood were investigated, the proprietors not only giving permission to traverse their lands, but providing local guides to conduct the party. These districts ought to have yielded great harvests of autumn fungi, but the rain had been too recent after a long spell of dry weather, and nowhere were the agarics found in "troops." Good collections were made, however, and some very unusual plants were found. Among these may be cited *Geaster fimbriatus*, *Hypochnus isabellinus*, and *Polyporus giganteus*, along with such micro-fungi as *Menispora ciliata* and *Arthrobotrys Curreyi* Berk., mistakenly called *Ctenomyces serratus* Eidam. The President for the year, the Rev. Dr. David Paul, gave an interesting address "On the Earlier Study of Fungi in Britain." Other important communications were made by Dr. Wager, Mr. A. D. Cotton, and Mr. J. Wheldon. The resignation of Mr. Carleton Rea from the positions of Secretary and Treasurer, which he has held with so much acceptance for twenty-two years, necessitated a change in the conduct of the Society. Mr. Rea consented to act as General Secretary and Editor. An Assistant Editor and the Officers were appointed, and these, with the addition of four elected members, were formed into a Council to carry on the business of the Society. Dr. Wager was appointed President for 1919. The arrangements for the Selby foray had been left in the hands of Mr. W. Cheesman, and the success of the meeting was due to his forethought and care.—A. L. S.

The *Journal of Ecology* for June contains papers "On the Relationships of some Associations of the Southern Pennines" by R. S. Adamson; "A Fox-covert Study" (in the parish of Cadney-cum-Howsham, N. Lincolnshire) by the Rev. E. Adrian Woodruffe-Peacock; "Cryptogamic Vegetation of the Sand-dunes of the West Coast of England" by W. Watson; and a continuation of the studies of the "Ecology of the Vegetation of Breckland," Suffolk, by E. Pickworth Farrow.

In the *Orchid Review* for July–August, Mr. Rolfe has a paper on "The British Marsh Orchises" in which the more recent literature concerning these puzzling plants is summed up. Mr. Rolfe regards *Orchis maculata*, *O. latifolia*, and *O. incarnata* as "thoroughly distinct, though their natural limits have been obscured by the camouflage of hybridity where they grow intermixed. To this we attribute the confusion into which the group has fallen. All the three possible combinations have been recognized in Britain—*O. maculata* × *latifolia* = *O. Braunii*; *O. maculata* × *incarnata* = *O. ambigua*; and *O. latifolia* × *incarnata*, usually called *O. Ascheroniana*, though the point requires confirmation." The paper contains much that is of special interest to British botanists, to whose attention we commend it.

The Trustees of the British Museum have issued the second edition of Part I. of the *Monograph of the British Lichens*, by Miss A. Lorrain Smith, which "covers the same ground as the first edition by J. M. Crombie [published in 1894], but has been completely rewritten." We hope to publish an extended notice at an early date.

THE ECONOMIC USES OF BROWN SEA-WEEDS.

By Magnus Spence.

(Deerness, Orkney.)

I. The Kelp Industry was introduced into Orkney in 1720 as a source of soda and potash used more particularly in the glass manufacture, corresponding to the production of "*barilla*" on the Spanish coast from sea-shore vegetation as *Salsola* and other Chenopods. During the French war it constituted the great source of alkali in this country, and prices rose considerably, the kelp-producing districts enjoying great prosperity and a population of 20,000 being maintained on it in Orkney alone. After the war, with free importation of alkali from other sources the industry decayed; and though maintained as a source of iodine, it never really recovered its former activity. Cheaper sources of iodine from Chili saltpetre residues, the introduction of Le Blanc's salt-cake process for soda, and more recently cheap supplies of potash salts from Stassfürt, have destroyed the industry; though during the present war more serious attempts at sea-weed utilization have been made in other parts of the world, plant being set up in British Columbia, as also previously in Japan. Where vast quantities of weed are thrown up on the shore gratis, it seems folly not to utilize the material, which consists wholly of living tissue, with no hard or intractable skeletal portions, or masses of woody tissue requiring complex apparatus for its recovery or handling. On the other hand, to burn such organic material for the sake of the salts is about as criminally foolish a proceeding as burning timber-trees for the sake of "potashes," and must be regarded as the expression of the economic ideas of a past age. Dry distillation has been more recently investigated in Sweden with encouraging results (*Nature*, 1918, p. 374): the product being illuminating gas, acetic acid, methylated spirit, formic acid, acetone, etc., in addition to the salts, improved iodine yield, and tars of the creosote type.

Kelp-burning is still carried on in a few localities in Orkney, but several hindrances have reduced the quantity exported to a mere fraction of what it once was: as reasons contributing to this, other than cheaper sources of supply of alkali and iodine may be included; (1) the small price allowed to the workers by the proprietors; (2) the improved monetary condition of agriculture. About a hundred years ago the amount manufactured in Orkney varied from 3000 to 3500 tons per annum, at from £7 to £10 per ton, thus bringing in a considerable addition to the earnings of the people, and to the incomes of the proprietors, who shared in the profits but not in the toil. The kelp-burners received only £2 10*s*. per ton for their labour from the landlord on whose sea-beach the sea-weed was driven: he exercised some supervision over the work, generally by means of an agent who advised as to kilns and purity of the kelp, and finally weighed the finished product. The landlord provided the vessel for export; but those who remember the operations state that his price was often £20 per ton—it rose to £20 during the Napoleonic wars, and occasionally between then and fifty years ago. If so, there is little wonder that the kelp industry was nearly killed, and can never be revived on such ill-proportioned terms. The landlord claimed the sea-weed as his own; and as the sward on which the whole was dried prior to burning was his, his income from the whole transaction was greatly increased. Twenty tons of fresh sea-weed produced one ton of kelp. On the shores of Deer sound, where the waters are well sheltered, there are still to be seen two score or more kilns where kelp used to be burned half a century ago. No weeds of any kind but *Fucaceæ* are available, and these had to be first cut with sharp hooks, and then carried to the sward, showing that early kelpers preferred these. The plants then used were *Fucus vesiculosus*, *Ascophyllum nodosum*, *F. serratus*, *Alaria esculenta*, *Laminaria saccharina*, and in addition the fronds of *L. Cloustoni*. More salts it is said were obtained from the same amount of *Fucaceæ* than from the tangles (*Laminariaceæ*). Tangles too were more difficult to dry, and when dried, to burn. Dried *Fucaceæ* are sufficiently inflammable to burn freely and vitrefy the mass of kelp; but tangles unless thoroughly dried, which it is difficult to do except in hot weather, require coals, which are expensive in Orkney, and this required a specially constructed kiln. Kelp-burning is now reduced to a mere fraction of its former quantities.

II. The utilization of Brown Sea-weeds as food for man in this country goes back to remote times, but is always the expression of an enfeebled condition of agriculture, and a means of maintaining existence under immediate pressure of starvation; as in the west of Ireland during the famine years. Nor does the cultivation of *Laminaria* in Japan, and its export to China, appear in any more favourable light, owing to the extremely low food-value of the material. Records for the utilization of *Laminaria saccharina*, *L. flexicaulis*, and *Alaria esculenta* are really but few, though these are emphasized in works on British marine algæ in the hope of contributing to the importance of the subject. Thus Johnson in his edition of Gerard's *Herball* (1633) records that *Laminaria* was eaten boiled with milk by fishermen at Margate; but in England improved methods of agriculture had given a better food-supply, and even then the custom was probably a survival as a matter of taste and convenience. In works on algæ of the early nineteenth century the idea is conveyed that *Alaria* was commonly sold and eaten in Scotland, and references are taken from McNeill (Lightfoot, Turner, Landsborough, Greville, Harvey). But the first mention of the fact is by Caspar Bauhin in his *Prodromus* (Basle, 1620), who had received plants and information from Cargill of Aberdeen some years before (1603). His remarks that "Baderlacks" were in season in September were religiously copied by subsequent writers for two hundred years, although the practice had fallen into oblivion. The food-value of the plants themselves is never more than that of hay, and the reproductive organs are the only parts at all digestible. Colloidal cellulose tissues, of uniform texture, give out little but salts, even on indefinite boiling. Sugars are wanting, though mannite is present in *L. saccharina*. Other reserves as colloidal polysaccharides are wholly indiffusible, except after grinding the material. No knowledge of the practice obtains at Orkney since the times of the French wars, and then only as an exception on the part of the destitute, with food at famine prices.

III. The utilization of weeds as food for cattle, rests on surer ground, animals having a greater capacity for dealing with vegetable material of the quality of hay than man. Fucoids were made use of for cattle and pigs in these islands up to about 60 years ago; but rather as a substitute when the ordinary food-supply got scarce. *Fucus* (*Pelvetia*) *caniculatus* was most in favour for cattle (Cowtang), and *F. vesiculosus* for pigs (Paddytang). When harvest was finished, cattle, sheep, and pigs, were let loose on the fields—a hundred years ago there were no turnips and mangolds—and the pigs went to the sea-shore and fed on the Twin-bladder-wrack. A pig is a very good guide, and the succulent receptacles of *Fucus vesiculosus* are the best the sea-shore has to offer, the pods being readily chewed, and full of reproductive cells in non-cellulose integuments. For the cattle *Pelvetia* was cut off the rocks, with other *Fuci*, as the first available (*F. vesiculosus* and *F. platycarpus*), carted home, boiled, and the "brae" was poured on hay, chaff and husks of oats. *Ascophyllum*, which does not bear pods till spring, was never used by anybody. Fuci have been so cut and used fresh for fodder within living memory.

The most striking economic use of sea-weed, however, survives on the Island of North Ronaldsay, the most northern outlier of the Orkneys; the island contains 440 inhabitants, it is about three miles in length, and from one to one-and-a-half in breadth, and is nearly all well cultivated. It is surrounded by a high stone wall, as near the sea as it was safe to build it; outside this dyke there is not more than half an acre, covered with grass of a very coarse kind, and beyond this pale the farmers and crofters are allowed to have from 2000 to 2500 sheep of a small native breed; but the numbers allowed each crofter are regulated by estate rules. Each crofter has a particular mark, as slits, holes, notches, curves, in different combinations, registered by a committee, which he imprints on the ears of the young lambs every season. The full-grown sheep is a handsome animal, no bigger than a Cheviot lamb a month old, and weighs when killed about twenty pounds. They are of different colours; but the prevailing shade is black. The other colours are grey, pied, moorit, and dirty white. The wool is fine, and is used for general purposes; a few crosses have been introduced, but they are not a success, at least in appearance, being ugly, deep-bellied, and lacking the alertness of the native. These sheep are fed entirely on sea-weed all the year round. When gales and snow-storms occur they have shelter at the lee side of the dyke. On the occasion of my visit to the island I noticed groups of fours and sixes going down to meet the incoming tide—it was a very fine day—and seizing hold of whatever their favourite was,—*Alaria*, fronds of *L. saccharina*,—chew away at the end of it. They did not object to standing knee deep in the sea to reach their food. In a few cases two had got hold of an end of the same *saccharina*, and by the time their heads met the feed was a *fait accompli.* The flesh of these sheep when taken directly from their feeding-ground is said to be rather "fishy"; but if fed on grass for a few weeks before being killed the meat is as tender and succulent as that of sheep fed in the usual way. These practices have gone on from time immemorial.

That deer come down to eat sea-weed on the tide-range in the northern parts of Scotland is often recorded, the weed being again useful as a source of salt; and there can be no doubt that rabbits when pressed for want of food similarly resort to sea-weed feeding. Last winter we had three weeks of a very severe snow-storm, when the grass was covered with from a few inches to two or three feet of snow. There are three islands without cultivation on which rabbits are abundant. The lighthouse keeper on Copinsay, close to these islands, told me that he watched the rabbits through a field-glass come down to the beach every day in considerable numbers to feed on the sea-weed. Where the rabbit-links are in close proximity to cultivated land, a portion of them only go to feed on sea-weed. During a snow-storm one can see the tracks of some going to the shore, and others going to the nearest turnip-field. Here they find ridges where the tops of a few turnips are still exposed; these they reach by scraping off the snow, and so keep themselves alive. For every six tracks I saw towards the shore there were twenty towards the turnips. A strange almost incredible story is involved in this shore-feeding. If you ask a farmer in possession of a rabbit-links when is the best time for shooting them, he invariably answers,—when the tide is ebbing. The verification of this fact can be realized almost any day. On one occasion I crossed a links with a gun after midday, and there was not a rabbit to be seen; the tide was full. Three hours after I returned over the same ground, when large numbers were out of their warrens. No one can explain it on any feasible supposition but that it is an inherited instinct from the time when all rabbits were forced during snow-storms and scarcity of food to feed on sea-weeds.

NEW OR NOTEWORTHY FUNGI.—PART VI.

By W. B. Grove, M.A.

(Concluded from p. 321.)

(Plate 550.)

293. **Myxosporium Polygoni**, sp. n.

Acervulis sparsis, subepidermicis, convexo-oblongis, ca. 500 μ diam., nigrescentibus, epidermidem multifarie rumpentibus. Conidiis magnis, ovoideo-oblongis, crasse tunicatis, granulosissimis, sæpe guttula magna subcentrali præditis, apice late rotundatis, basi subapiculatis, achrosis, 20–25 × 7–10 μ vel etiam 30 μ longis, sporophoris oblongis, irregularibus, subinde curvatis, obtusissimis, 20–24 × 3–5 μ suffultis, (Tab. 550. f. 12.)

Hab. in caulibus *Polygoni cuspidati* aridis, in Horto Botanico, Birmingham, Martio, socia *Phoma ancipite* var. *Polygoni*.

294. COLLETOTRICHUM HOLCI Grove, comb. nov.

Vermicularia Holci Syd. Hedwig. 1899, p. (137). Sacc. Syll. xvi. 894. Allesch. vii. 859.

Spots fuscous, scattered, oblong, then including the whole leaf. Pustules amphigenous, scattered or arranged ± in lines, lens-shaped, black, 90–120 × 50–60 μ, beset with 12–20 curved bristles; bristles chestnut-brown, eseptate, often bulbous at the base, tapering to a paler point, 80–100 μ long. Spores fusoid, curved or lunate, sometimes subacute at one or both ends, minutely pluriguttulate, 20–30 × 3–5 μ. (Tab. 550. f. 16.)

On fading leaves of *Holcus mollis.* West Kilbride, Ayrshire (Boyd). Aug.

This has been called a mere form of "*V. Melicæ* Fckl.," and it might be regarded as a delicate variety of *C. Dematium*, for the proliferous stratum round which the bristles are arranged is like that of the latter species, but much thinner and paler in all its parts.

295. COLLETOTRICHUM PETIOLICOLA Grove, comb. nov.

Vermicularia petiolicola Brun. Sphærops. Char. 1889, p. 39. Sacc. Syll. xiv. 908. ? *V. petiolorum* Schw. Syn. Amer. Bor. no. 1853. Sacc. Syll. iii. 223.

Pustules rather densely crowded, covered by the epidermis, then erumpent, globose-conical, at length forming a flattish disc, 100–200 μ diam., clothed with numerous very long stiff straight acute eseptate black bristles (up to 380 μ long by 8 μ broad at base). Spores ± fusoid, generally straight, 15–30 × $2\frac{1}{2}$–$3\frac{1}{2}$ μ; sporophores oblong, obtuse, faintly brownish, 16–20 × 3–4 μ. (Tab. 550. f. 17.)

On fallen petioles of *Acer Pseudoplatanus.* Eastham (Ellis). Nov.

The structure of the proliferous stratum is very nearly that of *C. Dematium* (*Verm. Dematium* Fr.). In the original description of Schweinitz no spores are mentioned, the specimens having probably been sterile; in these also few spores could be found, and those seemed to be immature. But Brunaud's specimens, while presenting no external characters that could differentiate them from *V. petiolorum*, furnished spores resembling those of *C. Dematium.* No doubt both are merely a variety of that species (var. *petiolicola*). The bristles, which are dark brown, paler towards the apex, by transmitted light, at first diverge in the usual way as they emerge through the rupture in the epidermis, but afterwards they become very crowded and ± parallel.

296. CYLINDROSPORIUM MICROSPERMUM Sacc. Mich. ii. 169; Syll. iii. 738. *Fusidium microspermum* Speg. Dec. Myc. p. 120.

Spots circular, indeterminate, amphigenous, pallid-yellow on both sides. Pustules hypophyllous, covered by the swollen epidermis. Conidia cylindrical, tapering slightly towards the ends, and acute at the tips, hyaline, sometimes slightly curved, 10–15 × 1 μ, at length expelled and forming a snow-white pruinose coating over the affected part. (Tab. 550. f. 15.)

On living leaves of *Saxifraga oppositifolia*, which it kills. Cruach Ardran, Crianlarich, Perthshire (Mr. John R. Lee), July 1918. Ben Lawers (Boyd).

Previously recorded from Italy on *Sax. rotundifolia.* Mr. Boyd says the infested plants are easily recognized by the abnormal pale-green colour of the leaves at the tips of the branches; the leaves lower down are brown and killed by the fungus. I am indebted to Miss E. M. Wakefield for the recognition of this species.

297. CRYPTOSPORIUM VINCÆ Otth. Bern. Mitth. 1868, p. 61. Sacc. Syll. xi. 585.

Var. *ramulorum* Gr. Acervulis ramulicolis, dense sparsis, rotundatis, nigrescentibus, centro pallidioribus, depressulis, ca. 200–300 μ diam., epidermidem levantibus tandemque poro lato rotundo apertis, absque pycnidio. Conidiis allantoideis, curvatis v. hamatis, utrinque subattenuatis, hyalinis, subinde guttulatis, $19–22 \times 2–2\frac{1}{2}$ μ; sporophoris brevissimis, e strato molli olivaceo parenchymatico oriundis.

Hab. in caulibus aridis emortuis *Vincæ majoris*, Seamill, Ayrshire, Apr. 1918 (Boyd).

Differs from the type merely in the shorter spores and in not being on leaves. The pustules are brownish, then blackish, at length elevated and whitish in the centre, where the epidermis is pierced by a rather wide pore.

298. LIBERTELLA OPULI Oud. Contr. Flor. Myc. Pays-Bas, xvii. 295. Sacc. Syll. xvi. 1021.

Pustules scattered, covered, elliptic or oblong, about $\frac{1}{2}$ mm. long, orange-yellow. Spores cylindrical, curved, rounded at both ends or more tapering below, $15–20 \times 2$ μ; sporophores filiform, about as long. (Tab. 550. f. 14.)

On thin twigs of *Viburnum Opulus.* Storeton, Cheshire (Ellis). Feb.

There was very little of this fungus present, but it seems to be identical with Oudemans' species, in which, however, the size of the spores is not given. The original description adds that the spores escaped in pallid-orange heaps, of which no sign was seen in this case. Accompanying it was a large quantity of a *Phoma*-like species, evidently not a *Phomopsis*, but also not agreeing with the description of *Phoma Opuli* Thüm.

299. **Marssonia Omphalodis**, sp. n.

Maculis vagis, sæpe confluentibus partemque folii dimidiam v. amplius occupantibus, fuligineo-umbrinis, pagina superiore quasi pallido albore allutis, haud marginatis. Acervulis epiphyllis, usque 100 μ diam., sparsis, innatis, rotundis, brunneolis. Conidiis oblongis, utrinque rotundatis, ut plurimum rectis, sæpe ad septum leviter constrictis, loculis rarissime inæqualibus, 2–4-guttulatis, $9–12 \times 2\frac{1}{2}–3$ μ.

Hab. in foliis languescentibus *Omphalodis vernæ*, Saltcoats, Ayrshire (D. A. Boyd), July.

The whitish coating with which the upper surface of the spots appears to be washed is due to the hairs and the loosened epidermis. It was not until the spores were strongly stained by iodine solution that the septum became apparent, although the fact of its existence was indicated by the median constriction. No pycnidial wall could be seen; if there was one, it was excessively thin.

300. **Actinonema Aquilegiæ** Grove, comb. nov.

Phyllosticta Aquilegiæ Roum. & Pat. Rev. Mycol. 1883, p. 28.

P. aquilegiicola Brun. Misc. Myc. ii. 33. Sacc. Syll. xi. 477.

Ascochyta Aquilegiæ Sacc. Syll. iii. 396 (saltem p. p.).

Glœosporium Aquilegiæ Thüm. Pilzfl. Sibir. no. 144. Sacc. Syll. iii. 700.

G. radiosum Rost. Bot. Tidskr. 1899, p. 269.

G. (*Asteroglœum*) *radiosum* Sacc. Syll. xvi. 1004.

Actinonema pallens Sacc. & Cav. in N. Giorn. Bot. Ital. 1900, vii. 301, f. II 4. Sacc. Syll. xvi. 936.

Spots whitish- or greyish-brown, with a narrow brown border, irregular, often roundish, $\frac{1}{2}$–2 cm. diam., covered with a whitish bloom (from the fibrils); fibrils white, epiphyllous, subcuticular, densely radiating, mostly dichotomously branched. Pustules numerous, epiphyllous, seated on the fibrils, pale yellowish-brown, at length darker, 50–100 μ diam. Spores oblong, very irregular, sometimes curved or inequilateral, tapering usually at the base, seldom at both ends, hardly constricted, hyaline, indistinctly guttulate, at first continuous, about 8 μ long, then 1-septate, occasionally 2-septate, 15–17 × 3–4 μ (or even up to 20 × 5 μ, but rarely). (Tab. 550. f. 18.)

On living or fading leaves of *Aquilegia vulgaris*. Saltcoats, Ayrshire (Boyd); Kew Gardens; Hereford. Jul.–Aug.

Most, possibly all, of the specimens in herbaria named "*Ascochyta Aquilegiæ*" belong to this species * (at least I have seen no true *Ascochyta* under that name) and, as the spores remain for a long time continuous, the same is probably true of all those named *Phyllosticta Aquilegiæ*. All of those examined, both English and German, were in poor condition, except those of Mr. Boyd, but this appears to be due to the fact that the parasite is very destructive of the leaf-tissue and the affected parts soon wither and disappear. But the Ayrshire specimens were better preserved and made the condition of things quite clear.

The fibrils are exactly like those of *A. Rosæ* Lib. The conspicuous ones near the surface are radiating and situated just beneath the cuticle; accompanying these are others which penetrate deeply through the epidermal cells into the mesophyll. In *A. Rosæ* the attacked cells become dark purple, but do not at once decay; in *A. Aquilegiæ* they are quickly destroyed, often leaving "shot-holes."

It is, of course, now well-known that *A. Rosæ* belongs, not to the Sphæropsidales as Saccardo classed it, but to the Melanconiales; had Saccardo recognized this fact, he would not have formed a new subgenus *Asteroglœum* for the present species. There is no trace of a pycnidium in either *A. Rosæ* or *A. Aquilegiæ*, the pustules are covered only by the cuticle. The pustules of the latter are exactly like those of a *Glœosporium*, such as *G. curvatum* Oud., but those of *A. Rosæ* are much darker and more suggestive (though falsely) of a pycnidium. It may be remarked in passing that the so-called "pycnidium" of *Sacidium*, which is described as "non-cellular," is nothing but the discoloured cuticle of the host.

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* The word "brunneis" used of the spores in the description in Saccardo (p. 397) must be a slip of the pen. *Cf.* "μ" for "cm." in the same description.

The biseptate spores in *A. Aquilegiæ* are abnormal; they are found also in *A. Rosæ*, but still more rarely. There are allied (non-European) species which have normally two or more septa: these have been segregated under the name *Asteromidium.*

Hyphomycetes.

58. Fusidium viride Gr.

After many years (thirty-four) I have found this fungus again, this time upon the cut surfaces of potatoes which had been chopped and thrown upon the ground in an allotment near Birmingham, in July of the present year. In the meantime it has been reported from Yorkshire on old stems of Foxglove and Butterbur. The present specimens enable it to be added that the size of the spores varies from 5 × 2 μ up to 9 × 3 μ, and that the colour of the large patches (about 2 cm. across) is nearly that called "invisible green" or "rifleman green," their deeper colour being due to the richer development of the fungus.

301. Ramularia Scrophulariæ Fautr. & Roum. in Rev. Mycol. 1891, p. 81. Sacc. Syll. x. 561.

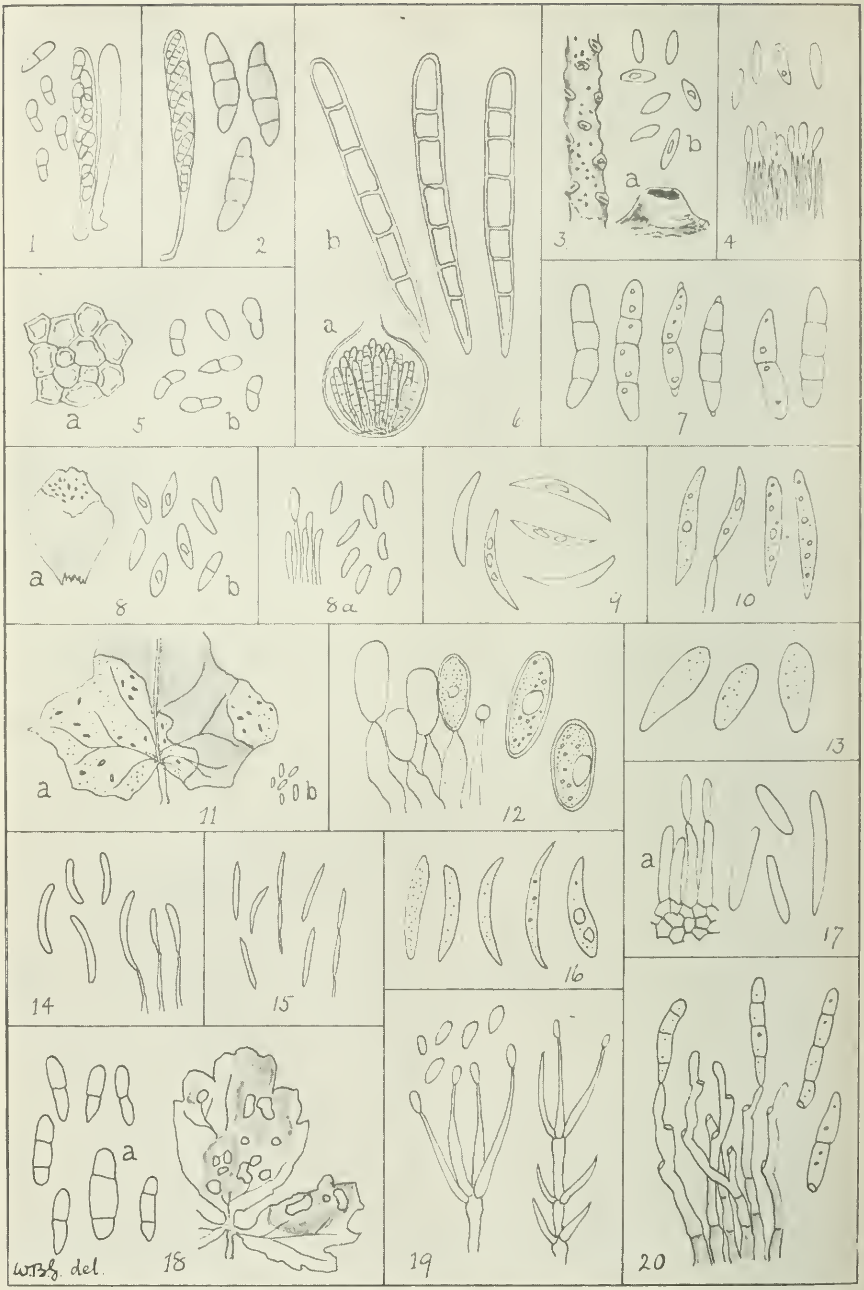
R. Nicolai Bubák, Pilzfl. Montenegr. 1903, p. 19. Sacc. Syll. xviii. 552. *Ovularia carneola* Sacc. Syll. iv. 122; Fung. Ital. t. 975. *O. duplex* Sacc. Syll. iv. 143; Fung. Ital. t. 976.

Spots 1–4 mm. broad, very angular (bounded by the veins and venules), greenish-brown, then ochraceous and surrounded by a dark-purple border. Tufts hypophyllous, minute, numerous, colourless, composed of many densely fasciculate hyphæ, which are at first eseptate, not straight, about 3 μ broad, here and there denticulate and ± pointed at the apex. Spores in chains, ovoid or oblong, 5–16 × 3–4 μ, quite hyaline, the longer ones sublinear and at length 1-septate.

On living leaves of *Scrophularia nodosa*, Ayrshire (Boyd). Trench Woods, Droitwich. July, Aug., 1918.

In the Droitwich specimens only a few of the spores were 1-septate, and these were, as is usual in such cases, longer and narrower (down to 2 μ) than the average. The hyphæ and spores can hardly be distinguished from those of *R. variabilis* on *Digitalis*, but the spots are widely different. With some of the tufts were mingled stouter hyphæ which showed a distinct olivaceous tinge, and there were a few faintly olivaceous spores, but these were obviously heterogeneous and should be regarded as mere intruders. In that case *O. duplex* Sacc. would naturally fall under the same species, as indeed is probable on other grounds.

Mr. Boyd's specimens (West Kilbride) agree in every respect with *O. carneola*, except that there is no tinge of rose colour. There can be little doubt that they are that species, for a rosy tint is often found in white Hyphomycetes and is not of specific importance: see Journ. Bot. 1912, p. 14. The spores are roundish to ovoid-oblong, 4–7 × 3 μ, and form long branched chains on tufts of hyphæ reaching 50 × 3 μ. The spots are similar to those described above, but with a greenish-brown, not purplish border. On another leaf (Stevenston, Ayrshire) the spots have hardly any ochraceous centre,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New or Noteworthy Fungi.

being wholly greenish-brown, but on this the tufts are very few and evidently only beginning to be developed. On comparing the whole series, it is impossible to come to any other conclusion than that they form stages of the growth of one and the same fungus.

302. VERTICILLIUM GLOBULIFORME Bon. Abhandl. Geb. Mykol. ii. 94. Sacc. Syll. iv. 152.

Var. ELLIPSOIDEUM var. nov. Conidiis ellipsoideis, plerumque $4–5 \times 1\frac{1}{2}–2\ \mu$, v. usque $7–2\frac{1}{2}\ \mu$. (Tab. 550. f. 19.)

On culms of *Juncus*, Sutton Park (Wk.). May.

The tufts of hyphæ are almost globular in shape, about $\frac{1}{4}$ mm. broad, each seated separately in the centre of a little thin circular bed of radiating white creeping flocci. The hyphæ that form the tuft are densely crowded, erect, frequently branched, irregularly below but towards the summit becoming trichotomous, and having at the end a verticil of three or four branchlets; the branchlets subulate, often incurved, about 20–25 μ long. The hyphæ are septate only at the nodes or points where the branches are given off. Bonorden's type of the species differed only in the globose conidia.

303. CERCOSPORA DUBIA Wint. Hedwig. 1883, p. 10. Sacc. Syll. iv. 456. *Ramularia dubia* Riess, Hedwig. 1854, pl. 4, fig. 9.

Spots roundish, 3–6 mm. diam., at first greenish-brown, then dry and pallid. Hyphæ fasciculate in little distinct clusters, amphigenous, olivaceous, appearing simple, but irregular, septate only below, paler upwards. Conidia terminal and lateral, subcylindrical or somewhat fusoid, 3-septate, colourless, minutely guttulate, $36–55 \times 5–6\ \mu$. (Tab. 550. f. 20.)

On living leaves of *Atriplex patula*. Near the Severn, Worcester. Sept.

The dark tufts of hyphæ are mostly collected in the centre of the spots; the hyphæ are marked with a very distinct oval hilum or scar at the points where the conidia were attached, and a similar scar is equally obvious at the base of each fallen conidium. The hyphæ are not simple, but really branched cymosely, somewhat after the style of *Phytophthora infestans*; an apical conidium is produced, and then the hypha grows out laterally below it (but without a septum), bearing another conidium at its apex, and the process is repeated. Miss E. M. Wakefield has kindly examined *C. dubia*, Rab.-Wint. Fung. Eur. no. 2780 (on *Chenopodium*), also Mycoth. Ross. no. 148 (on *Atriplex nitens*), and finds them to be identical. The same well-marked scars are also shown by specimens on *Chenopodium rubrum*, published by Sydow, Mycoth. March. no. 1195 as *Ramularia dubia*, which appears to be merely a younger state of the same species.

EXPLANATION OF PLATE 550.

(All figures × 600, unless otherwise described.)

1. *Mycosphærella Cydoniæ*, asci and spores.
2. *Leptosphæria Galiorum*. f. *Dipsaci*, ascus × 200, and spores.
3. *Sclerophoma pithya*; twig of Pine, n. s.; *a*, single pustule × 18; *b*, spores.
4. *Phomopsis alnea*, spores and sporophores.

5. *Diplodina Cirsii*; *a*. structure of pycnidium × 360; *b*, spores.
6. *Hendersonia Typhæ*, var. *major*; *a*, vertical section of pycnidium × 200; *b*, spores.
7. *Stagonospora hygrophila*, var. *vermiformis*, spores (two in the centre still have the mucous appendices).
8. *Sporonema strobilinum*; *a*, scale of cone, with the pycnidia (reduced); *b*, spores.
8 *a*. *S. strobilinum*, var. *accedens*, spores and sporophores.
9. *Heteropatella umbilicata*, spores.
10. *Melasmia Urticæ*, spores.
11. *Leptothyrium Hederæ*: *a*, leaf of Ivy, bearing both *Hypoderma Hederæ* and *L. Hederæ*, n. s.; *b*, spores.
12. *Myxosporium Polygoni*, spores and sporophores.
13. *M. carneum*, var. *Carpini*, spores × 800.
14. *Libertella Opuli*, spores and sporophores.
15. *Cylindrosporium microspermum*, spores and sporophores.
16. *Colletotrichum Holci*, spores.
17. *C. petiolicola*, spores and sporophores.
18. *Actinonema Aquilegiæ*, leaf (reduced) and spores; *a*, very abnormal spore.
19. *Verticillium globuliforme*.
20. *Cercospora dubia* × 300.

NOTE.—By an oversight, the synonym *Placosphæria Urticæ* Sacc. (Syll. x. 236) was omitted under no. 287.

JOSEPH ANDREWS AND HIS HERBARIUM.

(Concluded from p. 331.)

II. THE HERBARIUM.

BY G. S. BOULGER, F.L.S.

M. ROTUNDIFOLIA Hudson. *Menthastrum folio rugoso rotundiore spontaneum, flore spicato, odore gravi* J. B. iii. 2. 219. *Mentha sylvestris rotundiore folio* C. B., R. S. 3, 234. 6. *A pasture near Bury, 20 Aug. 1744.

M. LONGIFOLIA Huds. Borely Mill, 10 Aug., 1744. [This is *Menthastrum spicatum folio longiore candicante* J. B. iii. 2. 221, R. S. 3. 234. 5. "Found by Mr. Dale, in a Meadow behind the Almshouses at Great Yeldham, in Essex, plentifully." It is *M. villosa prima*, No. 1 of Sole, E. B. 686. as *M. sylvestris* L.]

M. AQUATICA L. *Behind Cornard Mill, 1743. [This is apparently R. Syn. iii. 233. 6. *Mentha aquatica seu Sisymbrium*, No. 10 of Sole, E. B. 447.]

M. GENTILIS L. *M. verticillata* R. S. 3. 232. 4. From Bocking River side between the Fulling Mill and Harries Mill. 6 Aug. 1746. [This is apparently No. 21 of Sole, E. B. 1413, *M. rubra* Sm., as recorded from Bocking by the Forsters in Gough's Camden (1789).]

[Another specimen, labelled *M. fusca sive vulgaris* Park., from Bulmur, is apparently *M. gracilis* Sole, No. 16, E. B. 449, represented both in the Sherardian herbarium and in Dale's own by specimens collected by him "In the Hop-ground at Bocking plentifully" (R. Syn. iii. 232. *2).]

[A third specimen, from Cornard Mere, labelled *M. aquatica exigua* is certainly not *M. Pulegium* L., with which the *Index Kew-*

ensis identifies that name, but a form of *M. gentilis* (*sensu lat.*). It is recorded "By the New River's side near Stoke Newington," about 1710, in the MSS. of Adam Buddle, who is stated (R. Syn. iii. 232) to have observed it in Company with Mr. Francis Dale, who was probably brother or cousin of Ray's Braintree friend. It was probably identical with the last mentioned (*M. gracilis* Sole) with which it is combined by Dillenius (*op. cit.*). As to *M. exigua* L., See Journ. Bot. 1916, 223; 1917, 335.]

M. ARVENSIS L. Cornard and Bulmur to Wisboro, 1743. [Typical of Sole, no. 12, E. B. 2119, *i. e.* var. *vulgaris* Bab.]

LYCOPUS EUROPÆUS L. *In a pond . . . at Chilton. 21 Aug. 1744.

SALVIA VERBENACA L. *St. Gregory's Church, Sudbury, 10 June, 1745.

CLINOPODIUM NEPETA O. K. *Ballingdon [Essex], 24 July, 1744.

SCUTELLARIA MINOR Hudson. *Cornard Mere.

NEPETA CATARIA L. *Newton Road, Cornard Heath, 14 July, 1749.

LAMIUM AMPLEXICAULE L. *Great Cornard and Sudbury, 3 April, 1746.

LAMIUM PURPUREUM L. var. ANDREWSIANA mihi. **L. rubrum, foliis per ambitum nec serratis nec crenatis.* [See Journ. Bot. 1903, 150.]

STACHYS SYLVATICA L. *Field adjoining Newton Churchyard. 14 June, 1754.

MARRUBIUM VULGARE L. *Ballingdon hills, sparingly. 27 July, 1755.

TEUCRIUM CHAMÆDRYS Schreb. On walls of Norwich between St. Stevens (*sic*) Gate and Brazen Doors. 17 Aug. 1725.

AJUGA REPTANS L. *flore incarnato.* Sible Hedingham, Essex.

STATICE BINERVOSA G. E. Sm. 3. *Limonium Anglicum minus caulibus ramosissimis floribus in spicis rarius sitis* R. S. 3. 202. Gathered on Dover Cliffs Mr. Dale. Ramsgate. Mr. Dale. [Though slightly different in size, Mr. C. E. Salmon, who has kindly examined these two cliff specimens, pronounces them both *S. binervosa.* R. Syn. iii. 202. 3* is probably different, and more than this species is included in R. Syn. iii. 202. 2.]

PLANTAGO MAJOR. P. major panicula sparsa. From Chelsea Garden. [A teratological specimen showing phyllody of the bracts, much as in f. 127 in Masters's *Vegetable Teratology.*]

P. MEDIA L. var. *longifolia* Meyer. An Plantago rosea J. B., R. Hist. p. 876? [An equally good representative of f. 126 (*l. c.*).]

SUÆDA MARITIMA Dumort. *Blitum Kali minus album dictum* R. S. 3. 156. 14. Mersey Island.

CHENOPODIUM POLYSPERMUM L. *C. Betæ folio* R. S. 3. 157. *Kingsbury's Mere, Cornard in one of the stew ponds. 26 Aug. 1743.

ATRIPLEX PATULA L. An Atriplex sylvestris angustifolia altera caule procumbente Doody R. S. 3. 151. 2. In Mr. Baker's limekiln yard. 7 Aug. 1744.

A. LACINIATA L. *A. maritima latifolia dentata*, N. D. This I found by Tilbury Fort, Essex, Anno 1716. The figure of *Atriplex sylvestris vulgatior sinuata major* Park. answers well to this plant. [This ticket is by Dale: the locality for this nondescript does not appear among his contributions to R. Syn. 3.]

Rumex maritimus L. *Lapathum folio acuto flore aureo* R. S. 3. 142. Kingsbury's Mere, Cornard. 21 Aug. 1751.

R. conglomeratus Murray. *Lapathum acutum.* R. S. 3. 142.

R. sanguineus L. var. viridis Sibth. *An.* 6. *Lapathum viride.* R. S. 3. 141. In the grove by Ballingdon Brick-kiln. 6 July, 1744.

R. pulcher L. *L. pulchrum Bononiense sinuatum* R. S. 3. 142. July 1744.

R. obtusifolius L. *Lapathum vulgare folio obtuso* R. S. 3. 141. 9 July, 1744.

R. crispus L. *Lapathum folio acuto crispo* R. S. 3. 141. Goldingham Hall Lays, 13 July, 1744.

R. Acetosa L. *Lapathum acetosum vulgare* R. S. 3. 143. Ballingdon hills. 16 May, 1746.

Polygonum Bistorta L. *Bistorta major* R. S. 3. 147. *Sudbury. 18 May, 1747.

P. amphibium L. *An.* R. S. 145. *Persicaria Salicis folio perennis?* *Cornard Mere. 20 July, 1739. [This seems correctly placed.]

P. lapathifolium L. 6. *Persicaria mitis major foliis pallidioribus* D. Bobarti. R. S. 3. 145. Crown dunghill [Sudbury?] Aug. 1755.

[This is the species first observed by Bobart at Headington. R. Syn. 2. 58. (1696).]

P. maculatum Trimen & Dyer. 7. *Persicaria foliis salicis alba vulgaris* R. S. 3. *145. Chilton Hall [Suff.], 11 July, 1738. [This striking plant with strict habit, stem often spotted, leaves sessile, ascending and very silvery below, like those of *Salix alba* L., scattered thyrsi of flowers and perianth longer than the fruit, is apparently the *Persicaria argentea* of Petiver Hort. Brit. 3. 9 and also the *Persicaria maculosa incana*, his preceding form, the *Persicaria folio subtus incano* of Tournefort, Inst. R. H. 510, recorded as "Passim circa Londinum" in R. Syn. 3. 145. 5, as well as the form recorded from Buddle, Hort. Sicc. iv. 20 at R. Syn. iii. 145. 7. It is the *P. laxum* described by Babington (E. B. Supp. t. 2822) but not the *laxum* of Reichenbach.

P. Persicaria L. *Persicaria maculoso flore albo* R. S. 3. 145. On Lamash Common. 1743.

Thesium humifusum DC. Gogmagogs. 25 Aug. 1721.

Euphorbia Helioscopia L. Col. John Kingsbury's Garden at Newhouse, Wormingford. 26 Aug. 1750.

E. platyphyllos L. I received from Mr. Dale who gathered it in the Great Mr. Ray's Orchard at black Notley, Essex. In the *Synopsis* Ray writes, "It comes up spontaneously here in my own Orchard at Black Notley." Another specimen, labelled in Dale's handwriting "*Tithymalus segetum longifolius* Cat. Cant. App. R.

Syn. 193. Near Bath," is, as pointed out in R. Syn. 3. 312, the same species.]

E. PARALIAS L. Shore at Langham fort plentifully. 14 Aug. 1717,

CERATOPHYLLUM DEMERSUM L. and C. SUBMERSUM L. *In the Stour. 8 July, 1745.

CALLITRICHE PALUSTRIS L. Bulmer. 7 May, 1744.

C. INTERMEDIA G. F. Hoffm. Cornard Mere, Suffolk.

URTICA PILULIFERA L. Yarmouth, Golston and Alborough.

SALIX PENTANDRA L. Duke of Leeds's Park near Putney Heath 1711. R. S. 2. 292. 8 [By the Pond Side at Wimbleton; Mr. James Sherard, R. Syn. iii. 449. 2. The Duke of Leeds's Park was that of Wimbledon House.]

S. REPENS L. var. β. *fusca* Sm. R. S. 2. 291. 3. *Cornard Mere. 20 June, 1721.

S. REPENS L. var. ζ. *argentea* Sm. R. S. i. 215; ii. 291; iii. 447. 3. and Tab. xix. 3. Mr. Dale from Sandwich.

S. VIMINALIS L. R. S. 3. 450. 21. Brent Ely. 13 Aug. 1745.

MYRICA GALE L. Near Wareham in Dorsetshire. Mr. Dale, 5 June, 1731.

CASTANEA VULGARIS Lam. R. S. 3. 440. Assington [Suff.]. 15 July, 1745.

TYPHA ANGUSTIFOLIA L. R. S. 3. 436. *3. Earl's Coln, Essex.

SPARGANIUM MINIMUM Fr. Cornard Mere. 26 Aug. 1746.

POTAMOGETON NATANS L. In dikes at foot of Link hills, Maplestead, 19 June, 1730. This never varies from its smallness as I have observed for near twenty years: another specimen. *P. rotundifolium* R. S. 3. 148. 1. Cornard Mere. 2 July, 1728.

P. HETEROPHYLLUS Schreb. Cornard Mere. 20 July, 1739.

P. LUCENS L. *P. aquis immersum folio pellucido, lato, oblongo, acuto.* R. S. 3. 148. 2. Stour by Ballingdon Bridge: another specimen. Halsted towards Sible Hedingham. 12 Aug. 1748.

P. PERFOLIATUS L. New River nr. Islington and Hackney Marsh.

P. COMPRESSUS L. *P. caule compresso.* R. S. 3. 149. 8. *Goldinghall, Bulmur. 1711.

P. OBTUSIFOLIUS Mert. & Koch. *P. folio angusto pellucido fere Gramineo* R. S. 3. 148. 3. Cornard Mere.

P. DENSUS L. *P. seu Fontalis media lucens* R. S. 3. 149. 6. Great Cornard. 11 Aug. 1746.

ZANNICHELLIA PALUSTRIS L. *An Aponogeton aquaticum graminifolium, staminibus singularibus.* R. S. 3. 135. *Potamogitoni similis graminifolia* Syn. ii. 281. Under water in the River [Stour?]. 16 Aug. 1743.

TRIGLOCHIN MARITIMUM L. *Gramen marinum spicatum.* R. S. 3. 435. *I gathered it at Maldon in Essex, 1711.

T. PALUSTRE L. *Juncago palustris & vulgaris.* R. S. 3. 435. *Milford, 28 July, 1746.

STRATIOTES ALOIDES L. I gathered in the Isle of Ely and near Oakely Bridge between Norwich & Yarmouth. Aug. 1729.

Orchis mascula L. *An 5. Orchis obscure purpurea odorata* R. S. 3. 377. I gathered it on a little rushie Bogg in meadow Bulmur, Essex. 17 May, 1749. Could observe no spots on the labellum. [Whatever Ray's plant may be, this is *O. mascula* L.]

O. militaris L. 10. *Orchis galea & alis fere cinereis* J. B. (R. S. 3. 378) is not in Mr. Dale's opinion the Cawsham hills Plant, that being the *Orchis Zoophora Cercopithecum exprimens, Oreades* Col. Raii Hist. p. 1219. No. 30. Neither is it the *Orchis magna, latis foliis, galea fusca vel nigricante* J. B. (R. S. 3. 378. 11) found by Mr. Sherard at Northfleet. This pretty orchis I found in a little field on the left hand of the Gate that opens on to Water Belchamp Cansey from Bulmur. 27 May, 1729. So that this plant is new to us & not found before in England. See the figures and descriptions of *Cynosorchis altera* Ger. emac. 205. 2 and *Orchis Strateumatica* p. 215, no. 1 ejusdem & *Orchis Strateumatica minor* p. 216. no. 13.

[Dale writes from Bocking, May 30th, 1729, *i. e.* three days after Andrews found the plant: "I rec^d. yours with the Orchis on Wednesday but had not time then to return you thanks for it, nor answer your Quere. That it is the *Orchis galea et alis fère cinereis* J. B. 2. 755 I beleive upon reading attentively and compairing it diligently with his description, but not the plant which Mr. Ray so-called, having the authority of his own dryed plants against it. The synonims to that of Cawsham Hills being *Orchis zoophora Cercopithecum exprimens Oreades* Col. Ecph. 1. 319. *Orchis flore Semiam refferens* C. B. P. 82. *Cynosorchis latifolia hiante cucullo minor* ejusd. 81. If Mr. Sherard's plant is rightly figured it cannot be that of yours, the body being too short as are likewise the Arms which are also to broad. The Hood in yours is cut into 3 in the Dilenian its made whole; nor can it be the Plant of J. B. that being near half a yard high . . . I now return your Box and in it *Pimpinella major and Linaria cærulea foliis brevioribus et angust.* Synop. 3. 282*. *Mentha Cataria* grows not near me if you can finish me with 4 handfulls please to send it by Barnard the first opportunity."]

As appears from Dale's herbarium ticket, which I quoted *in extenso* in this Journal for 1883, p. 230, Andrews showed him the plant growing, nine years later (May 13th, 1738). Dale then wrongly identified it, but also describes the plant himself. As Andrews adds the note:—"The place where I found this Orchis is ploughed up & sowen with Oats this 9th of May, 1746 so I fear it is lost,"—it would seem that the history of *O. militaris* L. in Essex is confined to the years 1729–45.

O. pyramidalis L. *Bulmur Limekiln yard. 16 June, 1746. [Not otherwise recorded in this district.]

Gymnadenia conopsea R. Br. *Boggs at foot of Link hills, Maplestead. 14 June, 1744.

Aceras anthropophora R. Br. *Gallow hill Gravell-pitt, 25 May, 1744.

Habenaria viridis R. Br. *Orchis palmata minor flore luteo-viridi* R. S. 3.* I found this June 1744 with a yellow, a green & an iron-coloured flower. In the Bushy Pastures . . . Ballingdon & Rayner's Grove, Otter Belchamp.

H. bifolia Br. *Boggs at the foot of the Link hills, Maplestead, 27 May, 1746.

Ophrys apifera Huds. *Middleton hall Brick-kiln yard [Essex]. 17 June, 1745.

O. sphegodes Miller. Gallow hill Gravel Pitt plentifully, 3 May, 1745. [This is presumably in Suffolk. Ray recorded it from Bartlow, and abundantly between Shelford and Trumpington in Cambridgeshire; but there is a mistaken quotation from him in Gibson with reference to Ballingdon and I know of no certain record of the species for Essex.]

O. muscifera Huds. Acton Lane. 25 May, 1744.

Herminium Monorchis R. Br. *Ballingdon kiln-yard [Essex], 15 June, 1739.

Spiranthes spiralis C. Koch. Cornard Heath & Cornard Mere & on Armsey in Bulmur.

Listera ovata R. Br. *Lavenham, 27 May, 1748.

Neottia Nidus-avis L. C. Richard. *King's Wood, Sudbury, 8 May, 1728. Not found again down to 1743.

Epipactis latifolia All. Goldingham Hall Wood, August 1729 & 1755.

E. media Fr. Boyes Hall Grove, Halsted, 25 June, 1715, and Goldingham Hall Wood, 15 Aug. 1729.

E. longifolia All. *Woodhull between Acton Lane & the Hall, 7 July, 1746. Lungley's farm near the paper mills, Milford [Suff.] 8 July, 1746 & 28 Aug. 1745, with Parnassus Grass & Nummularia fl. purpurascente [*Anagallis tenella*]. *Boggs at the foot of Link hills, Maplestead [Essex], 12 Aug. 1748.

Iris Pseudacorus L. *Between Middleton & Henny. June 1740.

I. fœtidissima L. Between Halsted and Justice Sparrow's, Sible Hedingham.

Paris quadrifolia L. Goldingham Hall Wood, Bulmur.

Convallaria majalis L. In a wood on the right hand as soon as off Bulmur Tye towards Wickham.

Polygonatum officinale All. Gathered in late Mr. Dale's garden, June 14, 1739 [*i. e.* a week after Dale's death].

Ornithogalum pyrenaicum L. Keynsham, Somerset. [No doubt collected by Dale, 21 May, 1731.]

Allium vineale L. *Cornard. 3 July, 1739.

Colchicum autumnale L. *Bulmur. 9 Sept. 1749.

Narthecium ossifragum Huds. *Phalangium Anglicum palustre.* R. S. 3. 375. Putney heath.

Juncus maritimus Lamarck. *Juncus acutus maritimus anglicus* Park. R. S. 3. 431. 2. Mersey Is. [Wrongly named *J. acutus* by Hemsted.]

J. acutus L. *Cornard. 3 Feb. 1742.

J. effusus L. R. S. 3. 432. 6. *Milford, 22 May, 1746. Bulmur. 6 Aug. 1753.

J. conglomeratus L. Middleton Hall, 25 June, 1752.

J. acutiflorus Ehrhart. R. S. 3. 433. 9. *Cornard Mere, 30 July, 1739.

J. bulbosus L. 11. *An Gramen junceum capsulis triangulis minimum* R. S. 3. 434. 11. *Babery Heath [Suff.], 23 June, 1746.

J. squarrosus L. *Juncus montanus palustris* R. S. 3. 432. I gathered it on Putney Heath near London, 1711.

J. compressus Jacq. R. S. 3. 433. 8 and 10. Boeking; Redbridge, Essex side. 19 June, 1752; Bulmur Vicarage, 1745; Link hills, Maplestead; Babery Heath, 29 Aug. 1746.

J. bufonius L. R. S. 3. 434. 4. *Cornard common field. 23 June, 1749.

Luzula multiflora Lej. R. S. 3. 416. 2. Link hills, Maplestead. 27 May, 1746.

Schœnus nigricans L. 10. *Juncus lævis minor panicula glomerata nigricante* R. S. 3. 430. *In a boggy pasture . . in Milford [Suff.], 22 May, 1746.

Cladium Mariscus R. Br. *Cyperus longus inodorus sylvestris* Ger. R. Syn. 271. 3. 426. On the Mere by the Decoy. Pond at Wormingford. [This plant has never been recorded for Essex; but, as Babington says, "was formerly far more abundant than at the present time." It is recorded for Suffolk, Cambridge and East Kent.]

Eleocharis palustris Roem. & Sch. *Scirpus equiseti capitulo majore* R. S. 3. 429. *Juncus clavatus major & altior.* Petiv. Conc. Gram. *Bulmur, behind the Cock and Blackbird. 23 May, 1746. [The inn is now the Blackbirds, no such sign as the Cock and Blackbird occurring in Mr. Miller Christy's *Trade-signs of Essex.*]

Scirpus sylvaticus L. *Cyperus gramineus* R. S. 3. 426. *Assington [Suff.], 4 June, 1744. *In a bog at the foot of the Link hills, Maplestead, 17 June, 1730.

S. lacustris L. *S. palustris altissimus* R. S. 3. 428. *Cornard Mere. 20 July, 1739.

S. cæspitosus L. *S. minimus Equiseti capitulis* R. S. 3. 429. *Cornard Mere. June 1729.

S. fluitans L. *S. equiseti capitulis minore* R. S. 3. 431. *Cornard Mere. 2 July, 1745.

S. setaceus L. *S. foliaceus humilis.* R. S. 3. 430. [Same locality, 25 June, 1728.]

Carex pulicaris L. *Gram. cyper. minimum semin. deors. reflex. puliciformibus* R. S. 3. 424. 13. *Link hills, Maplestead, plentifully. 27 May, 1746.

C. disticha Hudson. R. S. 3. 423. 4. *Behind the Cock & Blackbird, Bulmur, 23 May, 1746.

C. divisa Hudson. *Gram. cyper. ex monte Ballon spicâ divulsâ.* R. S. 3. 423. 3. [Same locality, 5 July, 1746.]

C. vulpina L. R. S. 3. 423. 8. [Same locality.]

C. divulsa Stokes. R. S. 3. 424. 10. *St. Gregorie's Croft, Sudbury, Aug. 1746.

C. paniculata R. S. 3. 422. 1. *Assington Mill. 30 May, 1744.

C. remota L. R. S. 3. 424. 11. *Link hills, Maplestead, 27 May, 1746.

C. echinata Murray. R. S. 3. 424. 12. [Same locality and date as preceding. Wrongly identified as *C. muricata* L. by Hemsted.]

C. LEPORINA L. R. S. 3. 422. 2. [Same locality and date.]

C. ELATA All. R. S. 3. 418. 4. *Cornard Mere. 11 June, 1729.

C. GRACILIS Curtis. At the head of the spring in John Taylor's Hop-ground. 1739 and 1752. [The earlier specimen is labelled *C. gracilis* by Hemsted and is R. S. 3. 417. 2, which has been known as *C. acuta* L.: the other is identical, though referred by Andrews to R. S. 3. 418, *Gram. cyper. min. angustifol.*, which is probably *C. paludosa* Good. *i. e. acutiformis* Ehrh.]

C. PALLESCENS L. R. S. 3. 419. 8. Link hills, Maplestead, 27 May, 1746.

C. PANICEA L. R. S. 3. 418. 3. [Same locality and date.]

C. PENDULA Hudson. R. S. 3. 420. 13. From the Pear tree towards Wormingford, nearly 5 feet high. 12 July, 1751.

C. FLAVA L. *An* 15 *Gram. cyperoides min. ranunculi capitulo rotundo* R. S. 3. 425. 15. *Boggs bottom, Link hills Maplestead, June 1744. [The queried identification is *C. dioica* L.: *C. flava* L. is R. S. 3. 421. 18.]

C. SYLVATICA Hudson. R. S. 3. 419. 10. *King's Wood, Sudbury. 8 May, 1739.

C. PSEUDOCYPERUS L. R. S. 3. 419. 12. *Cornard. 16 July 1746.

C. HIRTA L. R. S. 3. 418. 7. *Link hills, Maplestead. 27 May, 1746.

C. INFLATA Hudson. R. S. 419. 9. *Langley's Moor, Milford [Suff.], where the Pinguicula grows. 1746–1753.

PHLEUM NODOSUM L. Wall next the River, Clare Castle. 27 Aug. 1745.

NARDUS STRICTA L. *Gramen sparteum juncifolium.* R. S. 3. 393. *Link Hills, Maplestead, 14 June, 1745.

GASTRIDIUM LENDIGERUM Gaudin. *An Panicum serotinum arvense spica pyramidata* R. S. 3. 394. *Ballingdon Limekiln yard, 23 July, 1739.

AIRA CÆSPITOSA L. *An Gramen miliaceum* segetale minus R. S. 3. 403. Stoke Maudlin Wood, Chilton, plentifully where the water stands in winter, 26 July, 1743, and Middleton.

A. PRÆCOX L. R. S. 3. 407. 10 and Tab. xxii. fig. 2. *Middleton [Essex].

AVENA PRATENSIS L. R. S. 3. 405. *Gramen avenaceum montanum spica simplici, aristis recurvis.* Ballingdon Hill, June 1728.

MELICA NUTANS L. *Gramen avenaceum nemorense glumis rarioribus ex fusco xerampelinis* R. S. ii. 262. 12. *Kingswood, Sudbury. May 1747.

MOLINIA CÆRULEA Moench. *Gramen pratense serotinum panicula longa purpurascente* R. S. ii. 260. 21. *Milford. 21 Aug. 1746.

POA TRIVIALIS L. R. S. 3. 409. 2. Friars Causey Wall [Suff.]. May 1728.

SCLEROCHLOA RIGIDA Link. *Ballingdon. 25 June, 1752.

CATABROSA AQUATICA Beauv. *Gramen miliaceum fluitans suavis saporis.* Merrett, Pinax. R. S. 3. 402. Cornard. 30 June, 1728.

Cynosurus echinatus L. . *Gramen alopecuroides* spica aspera brevi R. S. 3. 397. 5. [The specimen from Mersey identified by Hemsted with this Channel Island species seems to be merely a depauperate *Hordeum.*]

Festuca ovina L. *An Gramen capillaceum locustellis pennatis non aristatis* R. S. 3. 410. 9. Middleton; Link Hills, Maplestead; Lavenham, 12 May, 1746.

Triticum junceum L. 4. *Gramen maritimum spicâ foliacea.* R. S. 3. 391. 6. Mersey Island. [There is no doubt, such as Gibson suggests (*Flora,* p. 388), as to the identity of this species found by Dale in Mersea and first recorded by Ray in the *Fasciculus* of 1688.]

Elymus arenarius L. R. S. 3. 390. 3. *Mersey.

Equisetum maximum Lam. April 1744.

E. sylvaticum L. R. S. 3. 130. 4. In Kane Wood, near London. Shewn me by Mr. John Field Apothecary at the Bell in Newgate Street.

E. limosum L. Cornard. 13 Aug. 1746.

E. palustre L. var. *polystachya.* *By the riverside behind Milford parsonage. 25 Aug. 1743.

E. palustre L. var. *subnuda.* Cornard Mere. 20 July, 1739. Bogg in Milford where the Pinguicula grows. 22 May, 1746.

Ophioglossum vulgatum L. *On a bog in Milford near the paper-mills, where the Pinguicula grows. 13 June, 1746.

Osmunda regalis L. R. S. 3. 125. 4. Bogg near the Dove House in Heney [Essex].

Lastrea Thelypteris Bory. R. S. 3. 122. 7. *An?* *In a pond in a Lay adjoyning to a wood called Ponters & Roses in Great Cornard, Worningfield or Newton. 20 June, 1754. *In a pond in Walgrave's Gardens adjoyning to Armsey in Bulmur.

L. spinulosa Presl. *An* 3. *Filix montana ramosa minor argute denticulata* R. S. 3. 124. 3. *On the driest part of Link Hills in Maplestead.

[The Cryptogams of Andrews's Herbarium will be enumerated later.]

JAMES EUSTACE BAGNALL, A.L.S.

(1830–1918.)

The author of the *Flora of Warwickshire and of Staffordshire* was born in Birmingham, Nov. 7, 1830, and educated there at the celebrated school at Singer's Hill, where he was under the tuition of the head-master's sons, Rowland and Matthew Davenport Hill, afterwards two very famous Birmingham worthies, the former the inventor of the "penny post." In 1844 his business life began in his father's warehouse; in 1853 he was appointed to a responsible position in Messrs. Hinks and Wells's pen factory, which he continued to hold until 1897. Before he retired he was offered a partnership in the firm, which his modesty led him to decline.

In 1864 Bagnall was lent by a friend a small compound microscope; he then began to mount objects, his first attempt being a petal of *Geranium Robertianum.* Wishing to ascertain its name, he consulted Bentham's *Handbook* and identified it. From this time he became an enthusiastic student of botany; in the same year he joined the Naturalists' Union, a club just started in the town, but soon left it for the Birmingham Natural History Society, which had not long begun its career. When this Society was later divided into sections, the botanical section undertook the study of the flora of a district comprising ten miles round the town. Of this, by a happy accident, the part including the gem of the district, Sutton Park (then a wild almost untrodden area of heath, wood, and moorland), fell to Bagnall's lot. A list of the plants was published in the Society's Transactions for 1869–70.

Afterwards, when the Midland Railway Company, by a deplorable neglect on the part of the authorities, obtained powers to run a railway through the Park, he began a more thorough study of its flora, and of the changes induced by the making of the railway, the result of which was seen in the *Notes on Sutton Park and its Flora,* printed in 1877. Previously to this, in 1874, he had published his first contribution to the *Journal of Botany*, "The Moss-flora of Warwickshire," and his interest in mosses continued during the whole of his career: he added *Grimmia crinita* and *Dicranum undulatum* to the British flora, and used to boast that his moss-herbarium contained nearly every known British species, many of them of course obtained by exchange with collectors in other districts. In 1886, at which time he was Vice-President of the Birmingham Natural History and Microscopical Society—he had in the previous year been elected an Associate of the Linnean Society—he published a *Handbook of Mosses,* and in 1903 (Journ. Bot. 366, 388) a list of the Mosses and Hepatics of Worcestershire, which is reprinted with additions in *The Botany of Worcestershire* by Messrs. Amphlett and Rea (1909).

During the years from 1876 to 1888, Bagnall devoted the whole of his leisure time to the compilation of his chief work, *The Flora of Warwickshire*, which after having appeared serially, in incomplete form, in the *Midland Naturalist* was published in 1891 by Messrs. Cornish Brothers, Birmingham. Only five hundred copies of this book were printed, and nearly the whole of these were subscribed for before publication, a fact which says much for the esteem in which Bagnall was justly held by the botanists of the whole country. For this work he received the Darwin Medal of the Midland Union of Natural History Societies. One usually calls such a book a "compilation," but in his case this is scarcely true: the plants of parts of Warwickshire had, indeed, been studied by previous botanists—Ray, Withering, Purton, Perry, etc.—but Bagnall's was not a mind that was satisfied with half-measures. He determined to visit every part of the county himself, and personally investigate its flora; and when one knows how remote some of the districts are from Birmingham, and how difficult and slow they were then to reach, the magnitude of the task is evident. A railway-ride of three or four hours would often be followed by a long walk of twelve or twenty miles, and as the pace was necessarily slow the labour and fatigue were very great. Still, as he said, the work had to be done, and there was no one to do it but himself. The result is one of the best county Floras ever published, and a book which will endure for many years; a proof of this is seen in the second-hand booksellers' catalogues, where it still maintains its price—a fate much to be envied by some more recently-published Floras of Midland counties.

Bagnall devoted much of his time to the Roses and Brambles; he was recognized as an authority upon these groups, and published in this Journal for 1882 an account of the Rubi found in the county. At a later time, after many other contributions, including *The Mosses and Hepatics of Staffordshire* (1896), he compiled also a *Flora of Staffordshire* which appeared in the *Journal of Botany* as a supplement during 1901, and was reissued in pamphlet form. But he was now losing his vigour and was no longer capable of such heroic walks; this publication, therefore, inevitably falls a long way below the level of his previous work. During all these years he collected flowering plants, ferns, and mosses with great assiduity, and accumulated a large herbarium which passed some years ago into the possession of his native town. His latter years from 1901 were passed in quiet rest, on an annuity which he had bought with his savings; but during the whole time of his activity his working-days were spent in an office during the week, and he had nothing but the scanty leisure of week-ends (and they were week-*ends* in those days) to give to his favourite hobby. That he accomplished so much was due entirely to his single-minded devotion to it.

All those who came into contact with him, especially working-men with a taste for natural history, knew how ready he was to help, and many a tale was told among his acquaintance of his intense sympathy and kindness towards beginners. Among other things he often gave lessons to such students, but would never take any reward for his labours. There was scarcely any branch of inland systematic botany in which he was not proficient, except the Lichens; and those who know the peculiarly repellent kind of text-book then available on that topic will not be surprised at the omission. In politics he was a strong conservative, with a marked distaste for modern democratic notions; he was also a man of high ideals, with a great respect for religion.

Bagnall died at Aston on the third of September at the ripe age of nearly 88; during his last years he became dependent upon his faithful housekeeper—he was never married—and practically disappeared from scientific circles in the town, but his name will always stand out in the memory of those who knew him as that of an unassuming but vigorous and interesting personality, and the very type of those members who composed the Birmingham Natural History Society during its best and most palmy times. A portrait of him forms the frontispiece of a little sketch of his botanical work by his friend Mr. E. W. Badger, printed for private circulation at Birmingham in 1897. W. B. G.

SOME RECENT SCANDINAVIAN NOTES.

An interesting little volume has recently been published in Copenhagen by Carl Christensen, the well-known pteridologist, entitled *Naturforskeren Pehr Forsskål*, etc., giving an account of that naturalist and his journey to Egypt and Arabia in 1761–63, of which expedition Christen Niebuhr was the sole survivor. The author narrates the Danish expedition financed by King Fredrik V., often but erroneously referred to as "Niebuhr's Voyage," and the successive fatalities which reduced the numbers from six to one. Linné's pupil was the naturalist, until his decease at Jerim on the 11th July, 1763. Next follows a sketch of Forskål's life and studies, his stay in Copenhagen from 1760–61, and a summing-up of his character and work. The second part of the volume contains an account of Forsskål's collections, his manuscripts and their publication, and the present state of his herbarium. An appendix gives the text of forty hitherto unpublished letters and documents, nearly all in German, with four in French. The whole is a very welcome addition to our knowledge of the Swedish naturalist, whose name it may be mentioned, occurs in more than twenty varieties of spelling. The author has employed the most usual form, which is not that printed in the posthumous volumes brought out by Niebuhr in 1775–76.

Prof. H. O. Juel has just reprinted his memoir *Bemerkungen über Hasselquist's Herbarium* from the first volume of the newly established Swedish Linnean Society (Svenska Linné-Sällskapets Aarsskrift). As is well known, Hasselquist died at Smyrna in 1752, and his collections were seized by his creditors for debt. Queen Louise Ulrika was induced to buy them for the amount claimed. and Linné received some duplicates of the plants and a command to publish Hasselquist's journal. This narrative and the plants communicated formed the basis of the thesis *Flora palaestina.* in 1756. The main collection remained at Drottingholm till 1803 when King Gustav IV. gave the whole of the biological collections to Uppsala University. Thunberg was at that time in charge of the botanical garden, and he published a series of names of plants from Hasselquist's gathering. supplying in many cases names to the unnamed plants, some of them being erroneous.

The author then cites various species which made their appearance gradually in Linné's publications, and shows that this main collection could hardly have been seen by the great Swedish naturalist. Three species, *Leontodon lanatum*, *Artemisia judaica*, and *Origanum ægyptiacum*, are absent from the Linnean herbarium, but this may be a mistake, arising from the mistaken belief that specific names in the *Index to the Linnean Herbarium* (Proc. Linn. Soc. 1911–12, Suppl.) printed in italic type signify their absence, whereas it simply means that Linné has not written these names on any specimen in that herbarium; the plants may be there, unnamed or named by some other person. Then follow twenty-two pages of comment upon the plants now extant at Uppsala, and various remarks made by Hasselquist and later authorities.

We have also a plate referring to *Salix ægyptiaca*, giving a reproduction of Alpini's "Calaf, et Ban," side by side with a half-tone figure of the Hasselquistian specimen. The longest comment is on this puzzling and doubtful species; the author says "*Index Kewensis* identifiziert sie mit '*S. Safsaf* Forsk. = *S. subserrata* Willd. Diese Identifizierung ist ganz falsch, Linné's Art gehört nämlich zur Gruppe Diandræ, Willdenow's zu Pleiandræ." It is difficult after a lapse of twenty-five years to recall the reasons for a special reduction, but it seems from reviewing the matter, it arose most probably from the hazy statements of Willdenow from Forskål, and Andersson in DC. Prod. xvi. ii. 196, though the latter suggests its identity with *S. pedicellata* Desf. which Boissier (Fl. orient. iii. 1190) had already proposed.

The pamphlet under review is naturally much smaller than the same author's *Plantæ Thunbergianæ* already noticed in this year's *Journal of Botany* (p. 220), but is a very welcome addition to our knowledge of the botany of the Linnean period.

From the same volume we have to thank Prof. Tullberg for an extract entitled *Linné's Hammarby*, in which is related or summarised the known history of Linné's country house, seven English miles from Uppsala. We have reproductions of plans and maps of different dates, and views without and within, and some of the cherished memorials preserved inside. Catalogues of these are provided—first, that drawn up by Prof. T. M. Fries in 1902, and, second, that of Prof. Tullberg in 1917; the latter shows a photograph of the Chinese porcelain tea-set, with the *Linnæa borealis* fired into it, which has so often been mentioned by Linné and his successors. Since the year 1878, the estate has been national property, and its maintenance is therefore guaranteed. Prof. Tullberg in the above gives a condensed account of the estate from 1337, from Klingspor och Schlegel, "Uplands Herrgårdar," 1878, to the time when Linnæus bought it, in 1762, and its occupation till 1806 by his widow. An interesting account of a visit to the place by two Swedes in 1834, translated by Loudon from a German version, is printed in his *Gardener's Magazine*, xiv. (1838) 99–101.

B. D. Jackson.

THREE IRISH PLANTS.

By the Editor.

The following notes, relating to two plants and a name which find mention neither in *Cybele Hibernica* nor *Irish Topographical Botany*, although of little importance, may as well be put on record.

"Juncus effusus spiralis." This curious plant forms the subject of a short paper (with figure) by James McNab in Trans. Bot. Soc. Edinb. xi. 502 (1873). It was then in cultivation in the Edinburgh Botanic Garden, where it attracted the attention of the British Association in 1871. Mr. McNab writes: "This remarkable variety was originally found in the North of Ireland by the late David Bishop, while Curator of the Botanic Garden at Belfast. As far as I can recollect, only one plant was discovered, which has been perpetuated ever since by division of the roots .... Although good seed is very sparingly procured [produced ?] I had some collected and sown; and I can now affirm that it may be thus reproduced, as all the seedlings are more or less spiral." According to a notice of David Bishop, reprinted in the *The Cottage Gardener* ii. 306 (Sept. 1849) from *The North British Agriculturist*, the plant was found after he had left the Belfast Gardens "in the wilds of Connemara": it had before that date been exhibited by McNab at a meeting of the Edinburgh Botanical Society, and had also been sent to London botanists. The account of Bishop (1788–1849) written from personal knowledge, is the only published record of his work and may at some time be worth reprinting, as it is likely to be overlooked in its present position.

DABEOCIA POLIFOLIA var. ALBA D. Don. This form, which is recorded and figured in Sweet's *British Flower Garden* (2nd series, iii. t. 276), was gathered in the county of Mayo by J. T. Mackay in 1832." It is of course a mere colour-form, now common in gardens; Sweet's figure (see under t. 280) was from a cultivated specimen.

ULEX HIBERNICUS G. Don is in *Cybele* under *U. europæus*, of which it is rightly considered a form or variety, *strictus*: under this name it was published as a species by J. T. Mackay in Trans. R. Irish Acad. xiv. 166 (1824–5), but without description; he says: "This appears to be a new and distinct species; but, as it rarely produces flowers, has not yet been described: it may however be readily distinguished from the other two species by its erect mode of growth." In his *Flora Hibernica* (i. 74; 1836) Mackay regards it as a variety of *U. europæus*. Meanwhile the name "*U. hibernicus* G. Don" had appeared in Loudon's *Hortus Britannicus* (ii. 280; 1830), and in his *General System* (ii. 148; 1832) he publishes it with a kind of diagnosis. Maund (Bot. Garden. ix. n. 822; 1841) says that "*U. hibernica*" "sometimes called *U. strictus*, was first botanically described by the late David Don under the name we have adopted": David (who died in 1841) may be a mistake for George, who did not die until 1856.

SHORT NOTES.

UPPER TEESDALE PLANTS. A visit to High Force during the latter part of last April produced a few critical forms which seem to be unrecorded for v.c. 65 (N.W. Yorks) or 66 (Durham). The season was very backward; and in two cases the determination was made from roots transferred to my garden.

65, 66. *Erophila virescens* Jord. Common in both counties, in grassy or rocky ground, especially on the limestone, from 900 to 1600 or even 1800 feet; the only segregate observed, and often luxuriant. This very distinct species is remarkable for its bright green, glabrescent, fleshy leaves, usually arranged in a flat rosette, and for its showy, snow-white petals. It sometimes occurs hereabouts on unmortared walls, where the foliage tends to become duller and more hairy; the capsules are often broader and blunter than in our prevailing British form, which has them somewhat jujube-shaped, and they thus agree more closely with Jordan's figure.

65. *Cochlearia micacea* mihi. In bogs and rills, near the summit of Mickle Fell, at and above 2300 feet. New for England. Quite like the Scottish plant, excepting that, when grown in a pot, the foliage was paler green than usual. The ripe pods are veinless (an important character, strangely ignored both in Babington's *Manual*, ed. ix., and in the recent editions of Hayward's *Pocket Book*). It differs very much from *C. alpina*, so common in this neighbourhood, which I did not meet with above 1600 feet.

66. *Hieracium pellucidum* Laestad. Rocks near the High Force, and shaley streamsides above Bow Lee, north of Newbiggin, from 950 to about 1200 feet. Confirmed by Rev. E. F. Linton as being the type (var. *lucidulum* Ley); it agrees very well with my dried series and with W. R. Linton's description. This, no doubt, is the *H. murorum* of Backhouse's *Monograph* (1856).

66. *H. boreale* Fr., var. *Hervieri* Arvet-Touvet. High Force Wood, etc., at 950 to 1000 feet. The name was suggested by Mr. Linton. A considerable northward extension of range for this variety.—Edward S. Marshall.

Riccia Crozalsii Lev. in West Cornwall: a Correction. I find that the plant from the Lizard which I recorded (Journ. Bot. 1917, 10) as *R. Warnstorfii* Limpr. is really *R. Crozalsii* Levier. My previous experience of the latter was mostly drawn from the plant which I had seen at Harlech under the guidance of Mr. D. A. Jones. It was growing there in large, rather pale, intricate masses with very little violet colouring. The plant from the Lizard grew in small isolated rosettes, and the long narrow branches with marked violet colouring and generally numerous cilia gave it much superficial resemblance to *R. Warnstorfii* Limpr. I had kept the plant from the Lizard in cultivation ever since I gathered it, and this year it developed remarkably well. On a more careful and fuller examination of it in a fresh condition when at its best in the spring, I came to the conclusion that the plant was certainly *R. Crozalsii* Levier, and Mr. D. A. Jones, who is very familiar with this plant in all its forms and who happened to call on me at the time, entirely confirmed this view. *R. Crozalsii* is a plant of southern distribution—I have gathered it sparingly on Vesuvius—and it matures in the spring, while *R. Warnstorfii* has a northern distribution and matures in the autumn, before the stubble-fields in which it is generally found are ploughed up. When both are equally well-developed it is not difficult to distinguish *R. Warnstorfii*, which almost invariably grows in isolated rosettes, from *R. Crozalsii*, by the different frond section, but when the material is poorly or abnormally developed the differences, as is the case with other species in this rather difficult genus, are less easy to make out.—W. E. Nicholson.

Hypnum falcatum (Brid.), var. nov. delicatulum Dixon.—Mr. G. T. Harris of Sidmouth, in connection with a paper he is preparing, recently sent me a specimen of a Harpidioid *Hypnum* from Dartmoor, which seems to deserve a varietal name. As Mr. Travis's paper is hardly of the nature to be a suitable medium for the publication of a new form, he has asked me to send a description of it to this Journal. Mr. Travis had previously submitted it to Mr. J. A. Wheldon, who gave it as his opinion that it was probably worthy of a varietal name. It may be diagnosed thus:—Tenellum; magnitudine var. *gracilescenti* simile, sed laxius, mollius, parcissime ramosum, foliis multo longioribus, cellulis alaribus tenuibus, plerumque hyalinis; paraphyllis paucis. *Hab.* Headland Warren, Dartmoor, in a small stream, coll. G. T. Harris.—H. N. DIXON.

NITELLA OPACA Agardh IN HEREFORDSHIRE. I found this plant, both ♂ and ♀, growing in Warlow Pool, Eaton Bishop, last July, by floating out a handful of the dense mass of Duckweeds and *Riccia fluitans* covering the surface, when its delicate green threads came to light. Mr. James Groves has kindly named it for me. Besides being the first record of this species in the county, it is at present the only example of the genus known to exist in Herefordshire, as *N. flexilis*, once found by the Rev. A. Ley over forty years ago, soon disappeared.—ELEONORA ARMITAGE.

PYRUS TORMINALIS Ehrh. In Hertfordshire, while "not infrequent in the south of the county" (Coleman, *Flora*), and recorded in a number of stations in the Colne and Lea basins, it becomes rare in N. Herts. Until 1918, I had never seen a tree in the Ivel District, but in September I came across one bush in a hedgerow near Little Hile End, E. of Hitch Wood, upon boulder clay. It is not recorded for Bedfordshire.—J. E. LITTLE.

SOLANUM AURICULATUM L. IN ST. HELENA. Mr. H. D. Bartlett writes from St. Helena:—"I am sorry to say a good deal of the higher land has been cleared lately to plant *Phormium tenax* which I fear will have killed some of the few remaining native plants. Some of the introduced plants also are spreading, especially *Ageratum conyzoides* and *Solanum auriculatum*; the last-named especially is likely to kill some of the natives, as it is going up to the higher parts of the island where *A. conyzoides* does not. Mellins, in 1875, says, 'recently introduced from the Royal Gardens at Kew.' I wish they had kept it there! Now I think anyone would take it for a native. Sir D. Morris named my specimen for me."

ARABIS SCABRA: A CORRECTION (p. 296).—The plant in the Andrews Herbarium is *Sisymbrium Thalianum* J. Gay. A specimen gathered on the same date is labelled in Dale's Herbarium "Turritis minor ramosissima et elatior. An Turritis minor foliosa Pet. Herb. Brit. which Dr. Plukenet found at Axbridge in Somersetshire, not far from this." Plukenet's plant was placed as a var. β. by Hudson and Smith; but the latter correctly remarks that none of the varieties are at all constant.—G. S. BOULGER.

REVIEW.

An Interpretation of Rumphius's Herbarium Amboinense. By E. D. Merrill. 8vo, pp. 595. Maps. Manila: Bureau of Printing, Nov. 1, 1917.

Species Blancoanæ: a Critical Revision of the Philippine Species of Plants described by Blanco and by Llanos. By E. D. Merrill. 8vo, pp. 423. Manila: Bureau of Printing, June 15, 1918.

Mr. Elmer D. Merrill, to whom botanists are so greatly indebted for his researches in Philippine botany, has added to their indebtedness by the publication of the works named above. He had already shown his competence for an undertaking of the kind by his *Review of the Identifications of the Species described in Blanco's Flora de Filipinas* (1905), but that was a light task compared with that presented by the *Herbarium Amboinense*, which, since its publication in the middle of the eighteenth century, has furnished a storehouse of information for botanists, from Linnæus downwards, and has also presented numerous puzzles which, thanks to Mr. Merrill, have now for the most part been solved. The work could not have been better done, from whatever point of view we regard it: it is fitly dedicated to Dr. Charles Budd Robinson (1871–1913), who at Mr. Merrill's suggestion had undertaken the task, and had proceeded some way towards fulfilling it when, after less than five months' field work, he was murdered by natives not far from Amboina, leaving its completion in Mr. Merrill's hands.

In the readable introduction, the importance of the *Herbarium Amboinense*, which "it is by no means certain is fully appreciated," is set forth, and a warm tribute is paid to the extent and value of the book. An account of the author, George Everhard Rumpf (1627–1702) follows, and of his undertaking; this is followed by a general account of Amboina and its flora, which is typically Malayan, with a considerable endemic element, and of the arrangements which were made for its exploration "with the special object of collecting and studying the Rumphian species in their native habitat in connection with all data given by Rumphius." In 1900 Dr. Boerlage, of the Buitenzorg Garden, accompanied by Dr. J. J. Smith, visited Amboina with this object, but he contracted fever and died in August of the same year. It was not until 1913 that the exploration begun by Dr. Robinson was approved and set on foot, but he had previously carefully analyzed Rumpf's volumes and laid the foundation for a complete enumeration of their contents.

Following this comes a section on the interpretation of Rumphian species as types and by various authors, from Linnæus and Stickman (1754) to Hasskarl (1866): Mr. Merrill calls attention to the differences existing between Stickman's original dissertation and the reprint in Amœn. Acad. iv. (1759), and points out that "certain binomials which have not been listed in the *Index Kewensis* appear in the 1759 reprint": this also applies to other numbers of the

Dissertations and their reissue in the *Amœnitates*—it may be noted that a set of the originals is in the Department of Botany.

The work of John Burman in editing the *Herbarium* and the "Index universalis" (1755) added by him at the end of vol. vii. (the "Auctuarium") are described, as well as the "Index alter" which he published later (1769). This latter is stated to be rare: Rouffaer and Muller in their bibliography of Rumphius say that it is "lacking in such libraries as those of Leiden, Upsala, Halle and Munich." Mr. Merrill probably thought it unnecessary to say that this, although it has a separate title-page, was printed by Burman with his Index to the *Hortus Malabaricus*: the pages are not numbered, but the first two, containing the title-page and "prooemium," form part of sheet C of the Index to the *Hortus*, and the lettering continues with sheet D. If separated from its context, the "Index alter" might well be regarded as an independent publication. The "alter" I think relates to the Index which precedes it, not to that of *Herbarium Amboinense* to which the word is generally understood to relate. I venture to suggest that the apparent rarity of the "Index alter" may be due to the fact of its association with the Index to the *Hortus Malabaricus*, which is often bound up with the last volume of the work just named.

Besides these we have in the Department of Botany two Indexes to the *Hortus* which I have not seen elsewhere, and of which I find no published notice. The work, which is stitched into a plain brown paper cover, and of which the provenance is not known, is in folio, and consists of two parts: there is no title, and the only dates are those contained in the preface which occupies the first page, and which, in view of the rarity of the work, may be worth transcribing literally:—

"REGISTER

OP HET

AMBONS KRUID-BOEK

VAN

G. E. RUMPHIUS.

"Dit *Kruid-Boek*, in zes Deelen in Folio, door den Heer JOANNES BURMAN, BOTANICH Professor te *Amsterdam*, van den Jaare 1741. tot 1750. uitgegeeven wierd den 20. Juny 1755. gevolgd door een zevende Deel, bevaltende het *Auctuarium* of de vermeerdering, waar agter een *Index-Universalis* is gevoegd, dan dewyl dit byvoegsel met heb Register zeldzaam gevonden word, het ik nodig g'agt dat Register alhier te laaten herdrukken, en by het zelve te voegen zoo wel de Maleidsche Naamen, als de Naamen in het *Species Plantarum Caroli Linæi*, derde Druk te *Weenen* in 1764 uitgegeeven, zoo mede de Naamen te vinden in de *Flora Indica* van den Heer NICOLAAS LAURENS BURMAN, in 4to. in 1768. uitgegeeven."

Although written in the first person, no clue is given to the author. The preface is followed by 16 numbered pages in bold type, the first containing a list of the contents of the twelve books of which the six volumes of the *Hortus* are composed, with the seventh, or "Auctuarium." The remaining pages contain an index of the Malayan names, arranged in the order of the books, with their Latin equivalents and with references to the text, thus:

"I. Deel. I : *Boek-Eetbaare Vrugten*	
"MALEIDS	LATYN
Calapa	Palma Indica. I. d. I. b. I. H. p. 1."

This is followed, as indicated in the preface, by a reissue of the "Index Universalis," which corresponds in every particular, even to the absence of pagination and certain misspellings, with that issued with the *Auctuarium*—except that, in order to allow of the addition of the Malayan names, some of the Linnean synonyms are abridged; the first name with references may be quoted from each as illustrating the alteration:

"Abedaria . . . l. 11. c. 35. t. 6. *Verbesina.* Acmella L."
"Abedaria . . l. 11. c. 35. t. 6. *Verbesina.* Acmella L. Daun lada."

The printing of the two parts of the work is so different that at first sight they might be regarded as separate publications; but the catchword at the end of the first part and "finis" at the end of the second sufficiently indicate their connection. It may be noted that the reissued "Index Universalis" has been in the hands of someone who used it, as certain references are corrected in ink.

We have devoted so much space to this bibliographical detail that our comment on the remainder of Mr. Merrill's admirable volume must be brief. From the section on "the present state of Rumphian species" we learn that the "approximately 1700 plants" which are named and described as distinct can be reduced to about 1200 species. "Of these about 930 can be definitely or fairly definitely referred to binomials, and about 140 additional ones can be safely placed in their respective genera, leaving about 130 that from data and material at present available cannot be definitely located under the binomial system: some cannot even be placed in their proper families . . . . about 45 species, proposed by various authors, are known to-day only from the data originally given by Rumphius," and have not been satisfactorily placed. Striking examples are given of the errors which have "crept into systematic botany by interpretation of species by a Rumphian synonym, wrongly placed, rather than by consultation of the actual type specimen": other points connected with the interpretation of Rumphian species are also carefully considered.

We note with much satisfaction that "in nomenclature the rules of the Vienna Botanical Congress, including the list of *nomina conservanda* as well as the supplementary list adopted by the Brussels Congress have been closely followed." Under this head Mr. Merrill has much that is sensible, especially with regard to the necessity of determining "so far as possible the exact status of the species proposed by the older authors . . . We can no longer look on the work of this or that author, no matter how incomplete or imperfect, as unworthy of consideration, nor can we accept Hooker's dictum (Fl. Indica, p. 56) regarding species proposed by such authors as Blanco, that it was 'undesirable to devote time to their identification' . . . . The general adoption of the principle of priority has emphasized the great importance of what Hooker f. characterized as the antiquarian branch of botany . . . . The strict application of the rules of priority as to specific names has resulted in many changes of nomenclature, but these changes are inevitable if the International Code be followed," although "the conservative botanist will be shocked to learn that as a result of the present investigation such common, widely distributed, and well-known species as the pineapple, the soy bean, the cow pea and the pomelo must receive new specific names." Many such changes occur throughout the volume, but none have been made wantonly on insufficient knowledge, and in cases of complication Mr. Merrill has set forth the evidence on which they are based. Good examples of this occur on pp. 260–1, where *Cæsalpinia Crista* Linn. Sp. Pl. ed. 1 and *C. jayabo* Maza are substituted for the usually employed *C.* (*Guilandina*) *Bonduc* and *C.* (*G.*) *bonducella*, but they abound throughout the book; we have seldom seen a more carefully executed piece of work as regards synonymy than the elaboration of the notes, often at considerable length, which appears under each species. The sequence followed is that of Engler and Prantl; under each name is given the necessary synonymy, as well as the Rumphian name and the distribution of each species in Amboina, should it occur there: the typographical arrangement, often defective in works of the kind, is excellent; we regret, however, that the "recommendation" that commemorative names should begin with a capital letter has been disregarded. At the end of the book is a sequence of the Rumphian names in the order of the *Herbarium*, with binominal equivalents: we are glad to note that all names are included in one index.

Since the above was written, Mr. Merrill has issued a "critical revision" of the plants described by Blanco and Llanos, which in every detail of treatment corresponds with his work on Rumphius and is entitled to equal praise. He had already, as mentioned above, published a "review" of the species described by Blanco, of which the present volume may be regarded as a greatly enlarged edition. While the author endorses the criticisms passed by J. D. Hooker and Alphonse de Candolle upon Blanco's work, he points out that Blanco, as shown by his own statement, "made no claim to being a botanist, and credits him with "initiative, industry, and perseverance." "Most of the facts recorded are the result of observation, and even if he did make numerous grave errors in identification of species, his descriptions, as such, on the whole compare favourably with those of his contemporaries. In fact, descriptions in general, on account of their length, are distinctly superior to the very brief diagnoses appearing in the older botanical literature as a means of interpreting the species intended." Mr. Merrill is justly severe on the extravagantly-produced third edition of Blanco's *Flora* by Fernandez-Villar and Naves (1877–83) which "extends through three bulky and unwieldy folio volumes without adding a single item to our knowledge of the Philippine flora": of the three parts forming the fourth volume, "the third, forming the Novissima Appendix, is the only one of real value." Differing, as we have seen, from J. D. Hooker's view as to Blanco's species, Mr. Merrill has "devoted time to their identification," with the result that of Blanco's "686 new binomials and trinomials, approximately 195 supply the valid specific names for the various species under the International Code of Botanical Nomenclature": these names Mr. Merrill has adopted.

We regret that space will not allow us to dwell further on this interesting volume: Mr. Merrill has done much excellent work in describing the novelties of the Philippines, but none more useful than that of which the volumes now noticed are the outcome. Now that the War is over, will he not visit these shores and give us a similar account of the work of George Camel (1661–1706), whose drawings and specimens are among the treasures of the Department of Botany?

James Britten.

BOOK-NOTES, NEWS, etc.

The many claims to notice of Sir Edward Fry, whose long and honourable career was closed, within about a fortnight of his 91st year, at his residence, Failand near Bristol, on the 18th of October, have been sufficiently recognized elsewhere, but some record must be made of his botanical work. Whether the statement that, on his retirement from the Bench in 1892, Sir Edward announced his intention of devoting himself to British Mosses be accurate, we are not in a position to say; the subject however had already engaged his attention, and a lecture delivered by him before the Royal Institution in 1891 was subsequently printed in *Knowledge* and reissued in book-form in 1892. A second and revised edition, with new illustrations, was published in 1908; it contains an indication that he was preparing a volume on the Hepaticæ, which appeared in 1911 under the title *The Liverworts, British and Foreign*; of this a notice will be found in this Journal for 1911 (p. 175). Herein he was helped by one of his daughters, who also assisted him in the little volume on *The Mycetozoa and some Questions which they suggest*, published in 1889, of which a critical review appears in Journ. Bot. 1900, p. 45. In connection with this subject, in which he took great interest, Sir Edward wrote his sole contribution to this Journal (1912, p. 133)—a review of the second edition of Lister's *Monograph of the Mycetozoa*. Sir Edward became a Fellow of the Linnean Society in 1887: he was the brother of David Fry (1834–1912) who paid much attention to British plants, and of whom there is a notice in our volume for the latter year (p. 239).

The *Annals of Botany* published in October contains the following papers: 'Cell-structure and Autospore Formation in *Tetraedron minimum*,' by G. M. Smith; 'The Phyllode Theory of the Monocotyledonous Leaf,' by Agnes Arber; 'Notes upon *Tetracentron*, *Trochodendron*, and *Drimys*,' by I. W. Bailey and W. P. Thompson; 'On the Anatomy of Polycotylous Seedlings of *Cheiranthus Cheiri*,' by H. S. Holder and D. Bexon; 'Absorption of Gold from Colloidal Solutions by Fungi,' and 'The Influence of Immersion in certain Electrolytic Solutions upon Permeability of Plant-Cells' by M. Williams; '*Sphagna*, their Habitats, Adaptations, and Associates,' by W. Watson; 'Anatomy of Hazel-wood with reference to Conductivity of Water,' by M. G. Holmes; '*Mazocarpon* or the Structural *Sigillariostrobus*,' by M. J. Benson; 'On Cell-degeneration in *Botrytis cinerea*,' by W. B. Brierley.

Winter Botany, by Prof. Trelease (price 2$ 50, postpaid) is published by the author at Urbana, Illinois, and is described on the title-page as "a companion volume" to his *Plant Materials of Decorative Gardening*, which we have not seen. In this, we learn from the introduction, "an unusually full account was given of characters that are not mentioned in the usual handbooks, but the keys were based in large part on differences used by the old herbalists—position and other peculiarities of the foliage: the key of the present volume utilizes leaf-scar and bud differences in the same manner." It is a well-printed well-arranged book; there is a full description of each genus, with illustrations of the characters above indicated, followed by a clavis of the species: of the genera themselves a preliminary key is given. References are made to the works, of which a bibliography is given, in which the "winter-character" is stated; "questions of nomenclature are waived"—the American practice of trinominals is followed; useful information is introduced, and there is a glossary, followed by an index. The book is a model of conciseness and of a size convenient for the pocket.

The part of *The Essex Naturalist* published in October contains the interesting presidential address "On the Haunts of the Mycetozoa," delivered by Miss Lister in April last, and the conclusion of her history of their study in Britain, to which is added a list of the species found in Essex; an excellent paper on the Ecology of Lichens, with special reference to Epping Forest, by Mr. R. Paulson; and "some local anecdotes and reminiscences" of E. G. Varenne (1811–87) by Alfred Hills, which—in view of Mr. Boulger's biography already published in the *E. Naturalist*, of the present shortage of paper, and of the very trivial and not always edifying nature of the "reminiscences"—we are surprised that the editors should have considered worthy of publication: we have seldom seen nine pages less usefully occupied.

At the meeting of the Linnean Society on Nov. 7 there was read a paper by the late Prof. Arber and Mr. F. W. Lawfield on the external morphology of the stems of *Calamites*, with a revision of the British species of *Calamophloios* and *Dictyocalamites* of the Upper Carboniferous Age. Mrs. Arber read a paper on "The 'Law of Loss' in Evolution," of which the following is a summary: In the course of a comparative study of aquatic Angiosperms, extending over a number of years, the author has been led to recognize a certain minor principle which seems operative in some phases of evolution. It appears to be a general rule that a structure or organ once lost in the course of phylogeny can never be regained; if the organism subsequently has occasion to replace it, it cannot be reproduced, but must be constructed afresh in some different mode. The author proposes to term this principle the "Law of Loss." This law is obviously not susceptible of direct proof, but an attempt is made to show that, if used as a working hypothesis, it throws light on a number of structural features whose interpretation presents difficulties on other theories. Some time after the author had deduced the "Law of Loss" from a comparative study of living plants, she learned that zoologists had already arrived at very similar conclusions regarding Vertebrates from a study of their palæontological history. Dollo's "Law of Irreversibility" covers much the same ground as the "Law of Loss." The fact that the same principle has been recognized independently for plants and for animals—in the one case through a study of comparative morphology and in the other through a consideration of actual historical evidence derived from fossil records—seems to be an indication of the validity of the law.

A SUPPLEMENT to the *Proceedings of the Linnean Society* for 1917–18 contains transcriptions by Dr. Daydon Jackson of two letters to Linnæus from Tulbagh, Governor of the Dutch Colony at the Cape from 1751 to 1771, including a list of the plants and bulbs sent by the latter to the former about 1769.

WE have received the *Thirty-fourth Annual Report of the Watson Botanical Exchange Club*, which will be noticed in an early issue.

SEVERAL communications—among them a paper on the Roxburghs by Sir David Prain, in which the conclusions arrived at in the article headed "'John' Roxburgh" (p. 202) are rightly called in question—are unavoidably held over for want of space. For the same reason a review of *The Life and Letters of Sir Joseph Hooker* by Leonard Huxley (Murray, 36*s.* net) has been delayed, and it has been impossible to conclude within the year Dr. Wernham's Monograph of *Manettia*, begun as a supplement. With regard to this latter, it is suggested that the existing pages should not be bound up with the present volume but held over until next year, when the paper will be completed. It may be hoped that during the course of 1919 the restrictions which have compelled the reduction of the *Journal* may be removed, and that it will resume its pre-War dimensions.

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CORRIGENDA.

P. 30, l. 22 from bottom, for "Sphere" read Spore.
P. 121, l. 11 from bottom, for "*angustifolia*" read *officinalis.*
P. 200, l. 6 from bottom, for "Parkinson" read Tradescant.
P. 238, footnote, for "1863" read 1836.
P. 239, l. 16, for "xxxii" read xxx.
P. 240, ll. 14, 15 from bottom, for "21st of April, 1863" read 11th of April, 1864.
P. 295, l. 6, for "Hinds's" read Hind's.

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THE GENUS MANETTIA.

(TROPICAL AMERICAN RUBIACEÆ.—X.

continued from Journ. Bot. 1917, p. 285.)

By H. F. Wernham, D.Sc., F.L.S.

History.

The genus *Manettia* was known so long ago as 1756 by Patrick Browne, who described and figured the species now called *M. Lygistum* Swartz in his *Civil and Natural History of Jamaica*, of which the first edition bears that date. Browne described this as "Lygistum—*flexile fruticosum, foliis ovatis oppositis, petiolis pedatis, racemis alaribus*." His figure (t. 3. f. 2) is obviously that of a typical small-flowered *Manettia* (section Lygistum, v. *infra*). In the second edition of the same work, dated 1789—when binomial nomenclature was well-established—the same plant appears as *Petesia Lygistum*. The last name originated in the meantime from Linnæus, in the tenth edition (1759) of his *Systema Naturæ*, p. 894, in which he quotes Browne's t. 3. f. 2. *Petesia* was sunk subsequently into *Rondeletia*.

In 1771 Mutis published *Manettia*, in Linnæus's *Mantissa*, p. 553, basing the genus upon a Mexican plant, "an annual herb," which he called *M. reclinata* (*loc. cit.* 558), identical, I think, with the plant that Aublet discovered in Guiana and described four years later as *Nacibea coccinea* (see *infra*). Aublet, in 1775, in his *Plantæ Guianenses* described and figured two species of a new Rubiaceous genus *Nacibea* (*loc. cit.* i. 95. t. 37. ff. 1, 2); his figures leave no doubt that this genus is identical with Browne's *Lygistum* and *Petesia*. Linnæus, however, in the 1779 edition of his *Systema*, records *Petesia Lygistum* and *Manettia reclinata* as of separate generic rank. The earliest recognition of the identity of *Manettia* and *Petesia* is due to Swartz, who published the name *Manettia Lygistum* as synonymous with *Petesia Lygistum*, under the same genus with *M. reclinata* Mutis, in his *Prodromus*, p. 37 (1788). In the following year, 1789, Schreber recognized the identity of *Manettia* Mutis, and *Nacibea* Aublet, in his edition of Linnæus's *Genera Plantarum* (i. 75); but he introduced in the same work another name (ii. 790) *Bellardia*, with separate generic description, which is none other than of a small-flowered *Manettia*.

So far, then, the synonymy is clear; and Willdenow, in the fourth edition of Linn. Sp. Pl. i. 624, dated 1797, records all the then-known species thus:—

Manettia reclinata Mutis.
M. Lygistum Swartz (*Lygistum* P. Browne; *Petesia Lygistum* Linn.).
M. coccinea Willd. (*Nacibea coccinea* Aublet).
M. picta Willd. (*Nacibea alba* Aublet. *Manettia alba* mihi, *infra*).

Gmelin, in his *Systema* (1791) had recognized the same four species, but he separated Aublet's *Nacibea* from *Manettia*. Willdenow adds a fifth species—*M. lanceolata*; this is the *Ophiorrhiza lanceolata* of Forskahl (Descr. Aeg.-arab. 42), subsequently known as *Mussænda luteola* Delile. In 1916 I relegated this, with three other species, to a new genus *Pseudomussænda* (see Journ. Bot. liv. 297).

In 1798 Ruiz and Pavon (Flor. Peru & Chili, i. 58) recognized the synonymy of *Manettia* and *Nacibea*, and described three new species, with figures: *M. umbellata* (t. 90. f. *a*); *M. racemosa* (t. 89. f. *a*); and *M. acutifolia* (t. 89. f. *b*). The two last-named appear in Persoon's *Synopsis* (1805) as *M. mutabilis* and *M. acutiflora* respectively.

No further additions were made to the genus until the appearance in 1820 of the third volume of the famous *Nova Genera et Species* of Humboldt, Bonpland, and Kunth. These authors brought the total number of species to nine, by the addition of *M. uniflora* and *M. havanensis* (iii. 387); both these, however, have since been found to be identical with the variable and widely-dispersed *M. coccinea* (*q. v.*).

It is remarkable that up to this point (1820) all the species recorded belong to the small-flowered groups (see *infra*); nor was any description of a large-flowered *Manettia* (Schumann's PYRRHANTHOS) forthcoming until 1824. In that year Martius described and figured (Spec. Mat. Med. Brasil, i. 89, t. 7: Denkschr. K. B. Acad. München, ix. 95), the first-known large-flowered species, destined subsequently to be more widely cultivated, and covered more thickly with the confusion of doubtful synonymy, than any of the other species of *Manettia*, before or since. This is *M. cordifolia*; and although Martius proffers no comparison with species previously described, he seems to be in no doubt of the genus, which he identifies with *Nacibea*, quoting an abstract of the generic characters from A. L. de Jussieu's paper in Mém. Mus. Hist. Nat. Paris, vi. (1820) 384. A year (1825) later, however, Vellozo failed to recognize the genus, of which he describes and figures no fewer than seven species under a new genus *Guagnebina*, in his *Flora Fluminensis* (p. 45, tt. 115–121). He tells us that in vain he invoked the help of Aublet (the creator of *Nacibea*) in his enquiry for a genus previously described to which he might assign these species. Nevertheless it is remarkable that Vellozo, no less than Martius, regarded a large-flowered species, without hesitation apparently, as congeneric with typical small-flowered ones; for one of his seven species he calls *Guagnebina ignita*, and his figure of this alone leaves no doubt of its identity with Martius's *M. cordifolia* of the previous year. Of the remaining six, four are obviously typical small-flowered *Manettias*, while the other two are members of the intermediate group (Schumann's HETEROCHLORA), the first of this group to be described. Vellozo's record is thus important historically, as showing his opinion that the members of all these groups are congeneric—an opinion that is still open to doubt, although it seems to have been accepted without doubt by these earlier systematists.

The identity of *Guagnebina* with *Manettia*, although suggested by Maund in 1838 (*infra*), was not published before twenty-five years later by Bentham, in his research upon Regnell's plants from Minas Geraes; among these he found *Guagnebina luteo-rubra*, which he renamed *Manettia luteo-rubra* (*Linnæa*, xxiii. (1850) 445). In justice to Vellozo's figures, which are not invariably everything to be desired, it should be said that this generic identity is obvious from any of the seven species figured.

In the meantime the very existence of *Guagnebina* was ignored by the many professed general systematists of that time—DeCandolle, in the fourth volume of his *Prodromus* (1830); Don, in his *General System*, iii. 483 (1834); Endlicher, *Genera Plantarum* (1836). Poeppig and Endlicher, in their Nov. Gen. & Sp. iii. 24 (1845), accept all the previously-published synonymy, but overlook *Guagnebina*; they add four new species, *M. micans*, *M. hispida*, *M. glandulosa*, and *M. paniculata*. This oversight of *Guagnebina* may be due largely to the fact that *M. cordifolia*—or rather its glabrous variety, the *M. glabra* of Chamisso and Schlechtendahl, had already become a familiar and favourite ornamental climber in hothouses. As such it was figured, in colour, no fewer than five times in the preceding decade—*i. e.*, in Bot. Mag. 3202 (1832); Bot. Reg. 1866 (1836); Paxton, Mag. Bot. ii. (1836) 267; Sweet, Brit. Fl. Gard. ser. ii. t. 233 (1836); and finally in the very beautiful picture in Maund's *The Botanist*, ii. (1838) t. 87. This last-named authority is of great importance, for in connection with the figure of *M. cordifolia* a new section of *Manettia* is proposed, to include that species, together with "*M. gracilis*, *M. pubescens*, *M. attenuata*, a new Peruvian species—probably *M. micans* Poepp. & Endl., a robust form of *M. cordifolia* (*q. v.*)—and *Guagnebina ignita* Vellozo." In other words a large-flowered section of *Manettia* (PYRRHANTHOS) was proposed, and the identity of *Guagnebina* with *Manettia* virtually recognized, albeit casually.

In 1829 Chamisso and Schlechtendahl had published the descriptions of seven new species of *Manettia* among Sello's Brazilian plants, including four of the Pyrrhanthos-group, and one only, *M. fimbriata*, of the small-flowered group. The remaining two, *M. ciliata* and *M. Pseudo-diodia*, are identical in the light of later research; but their publication is of interest in the history of the genus, as the former is merely a new name for a species of the group Heterochlora K. Schum., described originally by Sprengel in 1825 (see *M. pedunculata*, *infra*) under the name *Diodia pedunculata*.

Achille Richard (1829) in his *Mémoire sur la famille des Rubiacées* (Mém. Soc. Hist. Nat. Paris, v.) has left a contribution to the history of the genus that is rather curious than important. *Nacibea* and *Manettia* he unites, with several other genera or parts of genera under *Bouvardia*. *Nacibea alba* is, however, reserved as a separate monotypic genus, which he calls *Conotrichia*, distinguished by the obscurely toothed calyx (*obsolete 4-dentatus*), the short, almost globose corolla, and the cone of hairs that surmounts the throat. A series of excellent figures accompanies Richard's description (t. 14. f. 1); and should the question of raising the sections of *Manettia* to generic rank be urged, *Conotrichia* would undoubtedly have strong claims for its characters if not for its name. For the present, however, it may be regarded as linked to the Lygistum-group by way of several species (see Systematic Account).

We have now traced the history through the descriptions of the first-known species of each of the four sections of *Manettia* as arranged by Schumann in the *Flora Brasiliensis* (*infra*); namely LYGISTUM, the first of all; YSGINANTHUS, the type of *Manettia* itself; PYRRHANTHOS, introduced by Martius in 1824—*M. cordifolia*; and HETEROCHLORA, represented first in 1825 by Vellozo's *Guagnebina luteo-rubra*. In 1850, with the recognition of the identity of *Guagnebina* and *Manettia*, we have the latter genus constituted as it stands at the present day, with all its synonyms recognized by each of the principal systematists in turn.

The subsequent literary history is, comparatively speaking, unimportant, involving no more than the publication of new species, without question of the authenticity of the genus.

The late Karl Schumann's contribution in *Flora Brasiliensis*, VI. vi. 167, while leaving much to be desired in its details, is of value, because of his primary division of the genus into four sections. These are well marked each from the rest, and are readily recognizable by means of the following characters:—

I. § PYRRHANTHOS K. Schum. *Manettia* Mart. Corolla clavate elongated, rarely less than 3 cm. in length, generally much larger; gradually, but not much, widened from the base upwards. Limb usually spreading, relatively very small. Corolla quite glabrous externally, except in two species.

This section includes, of the species as arranged in the present study, new species being marked with an asterisk:—

domingensis Sprague.
Tweedieana K. Schum.
gracilis K. Schum.
**Burchellii* Wernham.
cordifolia Mart.
**boliviana* Wernham.
chrysoderma Sprague.
**stipulosa* Wernham.
**sublanata* Wernham.
zimapanica Hemsl.
pubescens Cham. & Schl.
**angustifolia* Wernham.

II. § HETEROCHLORA K. Schum. *Guagnebina* Vell. in part. Flowers of medium size. Corolla with stout tube upwards of 2 cm. in length, subcylindrical, or inflated at the base and gradually narrowed upwards, or sometimes inflated toward the mouth. Limb very small, the short lobes more or less erect. Corolla densely tomentose externally.

This section includes:—

quinquenervia Sprague.
pedunculata K. Schum.
Smithii Sprague.
luteo-rubra Benth.
inflata Sprague.
Rojasiana Chod.&Hassl.
calycosa Griseb.
**Holtonii* Wernham.
**scaberrima* Wernham.

This section is so sharply defined from the previous one, as well as from the rest, by the shape of the corolla, that the question arises of separating the two as distinct genera. Many other pairs of genera are much less clearly defined. This course, however, would interfere seriously with well-established nomenclature in cases like *M. cordifolia*, *M. luteo-rubra*, and others, so that it is desirable to retain the well-known name *Manettia* for all the four sections if practicable. In the case of the first two sections, the shape and size of the corolla afford the sole critical characters. In this respect *M. calycosa* and its allies *M. Holtonii* and *M. scaberrima* link § Heterochlora with § Pyrrhanthos on the one hand, by way of *M. angustifolia*, and with the small-flowered sections on the other, by way of *M. hispida* and allied species with relatively large corollas pilose externally. Such considerations seem to justify the retention of the present arrangement so far, so that *Manettia* may still include also the largest section,

III. § LYGISTUM K. Schum.; P. Browne. Flowers small. Corolla rarely exceeding 1·5 cm. in length, usually much less; hypocrateriform with limb relatively large, or occasionally narrowly infundibular with appreciable more or less erect lobes; tube cylindrical, or somewhat widened from the base upwards.

This section includes half the total number of species. They are named here, for the sake of completeness, and to show the extent of the progress attained in the present investigation; new species are indicated by an asterisk.

recurva Sprague.
canescens K. Schum.
**pichinchensis* Wernham.
evenia Sprague.
**corticifer* Wernham.
lygistoides Griseb.
**parvula* K. Schum. ex Wernham.
**Lobbii* Wernham.
**Trianæ* Wernham.
Guilleminiana K. Schum.
**pisifera* Wernham.
**thysanophora* Wernham.
Lindenii Sprague.
Lygistum Sw.
Schumanniana Sprague.
alba Wernham.
flexilis Brandegee.
barbata Oerst.
**utopia* Wernham.
microcarpa K. Schum.
diffusa Britton.
paniculata Poepp. & Endl.
**Sonderiana* Wernham.
**sabiceoides* Wernham.
**Moritziana* Wernham.
umbellata Ruiz & Pavon.
**dubia* Wernham.
Beyrichiana K. Schum.
tenuis Rusby.
meridensis K. Schum.
Bangii Rusby.
congesta K. Schum.
**congestoides* Wernham.
**verticillata* Wernham.
coccocypseloides Wernham.
racemosa Ruiz & Pavon.
**mollis* Moritz MS.
**Riedelii* Wernham.
acutifolia Ruiz & Pavon.
**Glaziovii* Wernham.

This section may include, for the present, the imperfectly-known and aberrant **M. capitata* Wernham and **M. Miersiana* Wernham.

IV. § YSGINANTHUS K. Schum. *Manettia* Mutis. In all the three previous sections the calyx is lobed to the very base, and free of the conspicuous cushion-like disc. This section is characterized by this feature, that the calyx is tubular at the base, the calyx-tube being adnate, more or less, to the hollow disc. This character is of considerable importance, in so far as it is constant and of discernible degree. But the tubular condition of the calyx at the base is observable to a greater or less extent throughout the genus, a corresponding extent of adnation to the rather pronounced disc following as a matter of developmental course. In the following species the existence of a basal "calyx-tube" is manifest, and these may reasonably be included in a separate section, § YSGINANTHUS of K. Schumann; they are arranged in the order of the present memoir:—

mitis K. Schum.
fimbriata Cham. & Schl.
**Pearcei* Wernham.
hispida Poepp. & Endl.
miniata Ch. Lem.
**dominicensis* Wernham.
**tarapotensis* Wernham.
pectinata Sprague.
pleiodon K. Schum.
glandulosa Poepp. & Endl.
**costaricensis* Wernham.
**Spraguei* Wernham.
coccinea Willd.
**Sanctæ-Martæ* Wernham.
**orbifera* Wernham.
divaricata Wernham.

I propose to retain these four sections (subgenera) as arranged by Schumann. To summarize, in the following systematic account 81 species are recognized, of which 34 are described for the first time. Of these 81, § PYRRHANTHOS has 12, § HETEROCHLORA 9, § LYGISTUM 42, § YSGINANTHUS 16, the remaining 2 being of doubtful affinity.

At this juncture we may perhaps venture upon a critical description of the genus. Preceding this, in the usual way, we have to consider the question of the NOMENCLATURE.

In the light of the preceding history, this offers no great difficulty. It is necessary, however, to point out that, in accordance with strict rule, the genus should be named not *Manettia*, but *Lygistum*—this name dating from 1756, while the previous more familiar name was published in 1771. Such change of generic nomenclature has already been proposed by Otto Kuntze, in his *Revisio Generum Plantarum* of 1891; but such alterations, however correct, are greatly to be deprecated. The name *Manettia* has been so long and so well established that almost every gardener is familiar with it, in connection with such well-known hot-house species as *M. cordifolia*, *M. bicolor*, *M. coccinea*; and the name *Manettia* should be indeed a *nomen conservandum*, a name to be preserved.

The correct names of the separate genera, were the sections to be raised to generic rank, forms an interesting problem in nomenclature.

The synonymy of the genus-name, then, will appear thus:—

MANETTIA Mutis, in Linn. Mantiss. (1771) 553.
Lygistum P. Browne, Hist. Jam. (1756) 142, t. 3. f. 2.
Petesia Linn. Syst. Nat. ed. x. (1759) 894, *ex parte*, *nec* P. Browne.
Nacibea Aublet, Pl. Guian. i. (1775) 95, t. 37.
Nacibæa Poiret, in Lam. Encyc. Meth. iv. (1798) 415.
Bellardia Schreb. Gen. Pl. i. 790.
Guagnebina Vell. Fl. Flum. 44, tt. 115–121.
Conotrichia A. Rich. in Mém. Soc. Hist. Nat. Paris, v. (1829) 277, t. 14. f. 1.

Calyx turbinatus v. subcylindricus v. campanulatus plerumque ad basin lobatus, basi nonnunquam breviter tubularis tubo plus minus ad discum adnato; lobi sæpius 4 denticulis nonnunquam interjectis, nunc parvi inconspicui nunc elongati angusti sæpe subsetacei nonnunquam ampli foliacei. *Corolla* clavata v. tubulosa majuscula v. parva hypocrateriformis nonnunquam anguste infundibularis rarius campanulata; limbi lobi sæpissime 4 breves pro rata latiusculi rarissime tubum excedentes. *Stamina* 4 corollæ in ore v. faucibus inserta filamentis brevibus antheris versatilibus. *Discus* pulvinaris v. annularis. *Ovarium* biloculare; ovula in loculis numerosa in placentis septi a basi erectis imbricata. *Capsula* turbinata v. ovoidea v. oblonga, plus minus sulcata, ab apice septicide bivalvis polysperma, calyce persistente coronata. *Semina* placentis in tumidis erectis peltatim imbricata, nucleo complanato ala conspicua cincto irregulariter dentata. *Herbæ* vel *suffrutices* volubiles caulibus gracilibus, *foliis* pro rata latis, *stipulis* breviter vaginantes. *Flores* majusculi v. plerumque parvi albi cærulei vel rubri axillares sæpius singuli bini vel pauci lateralibus in ramulis brevibus dispositi raro fasciculati umbellatim dispositi folia raro excedentes.

Its dry 2-valved capsular fruit containing many winged seeds, and its valvate regular corolla, entitle *Manettia* to a place in the Eucinchoneæ subtribe; it is distinguished from all the rest except *Hindsia* by the erect placenta, which is fixed to a point near the base of the septum. The few species of *Hindsia* are small erect shrubs with terminal inflorescences of slender long tubular flowers. *Bouvardia* also is an allied genus, in which the tendencies of the flowers to be aggregated into dense terminal inflorescences is realized in nearly all the species; this tendency we proceed to trace in the following pages among the species of *Manettia*. *Bouvardia* is a genus, of considerable size, of erect herbs and small shrubs.

The key to the species that follows is confessedly artificial, having for its object the specific determination of any given *Manettia* with the greatest possible speed, by means, therefore, of the most obvious and readily perceivable characters. It follows that the first two sections, § Pyrrhanthos and § Heterochlora, are clearly separated in the key; while the other two, the small-flowered sections § Lygistum and § Ysginanthus, are mingled indiscriminately. The artificial nature of the key appears also in the criteria of leaf-size and corolla-tube length; in regard to these items it is scarcely necessary to point out that any key must be employed with caution. In the more difficult cases the same species appears more than once: so that this clavis must not be taken to reflect anything approaching an evolutionary grouping. In the general systematic account of the species which follows they are arranged and numbered as far as possible in accordance with their mutual affinities.

SPECIFIC AFFINITIES.

In this connection it may be desirable to draw attention to one or two evolutionary tendencies observable within the genus.

In the *New Phytologist*, x., xi. (1911–2)—“Floral Evolution”—

I have ventured to suggest that Rubiaceæ, with the allied families that together compose the order Rubiales, reflect a general tendency to close aggregation of flowers into a continuous surface, thereby facilitating cross-pollination by exposing a large number of flowers to the effects of a single insect-visit—the so-called "umbellifloral" tendency (*op. cit.* xi. 222, 382, etc.).

From this aspect *Manettia* may be regarded as relatively primitive, reflecting but little the realization of this tendency; for in most of the species the flowers are mingled more or less indiscriminately among the leaves, and are not aggregated into very definite units of inflorescence. This primitive arrangement—or rather lack of arrangement—is readily observable in the Pyrrhanthos-section, in which the flowers are relatively "few and far between." But even in this case the leaves in the neighbourhood of flowers tend to become much smaller than those composing the general vegetative bulk, and they tend also to a uniform shape—often approaching the orbicular. The flowering branches, too, tend to be much abbreviated, and also to aggregation. These points are clearly shown in the herbarium-specimens of *M. cordifolia* and its varieties—and, indeed, throughout the Pyrrhanthos-section, in which insect-adaptation is attained chiefly through enlargement of the individual flower (see New Phyt x. 79, etc.) accompanied by reduction of neighbouring leaves—the foliage being cleared, so to speak, to make way for the flowers. The general transition from vegetative leaves to bracts and bracteoles is clearly discernible in a comparative study of these forms; although in some cases the bracteoles are connate into small sheaths about the pedicel, being probably of stipular nature.

Still more primitive in this regard are most of the Heterochlora-species. In these there is little or no sign of floral aggregation, and the evidence of leaf-reduction is very faint. The principal indications of any tendency to insect-adaptation are 1st, enlargement of individual flowers, culminating in the inflated corollas of *M. Rojasiana*; and 2nd, lengthening of the flowering stalks, the flower being carried thus more or less free of the leaves; this feature is also well reflected in *M. Rojasiana*.

M. calycosa, which in many ways represents the transition between § Heterochlora and § Lygistum, displays a very decided tendency to floral aggregation. The relatively small flowers are borne, several together in the axils, in an abbreviated, more or less umbellate inflorescence.

In the large section Lygistum the flowers are invariably aggregated, two or three together at least, into axillary inflorescences. In the species that are least advanced in this respect the inflorescence is considerably exceeded by the leaves. Such is the case, for example, in *M. Lygistum* itself and its nearer allies. This covering of the floral by the vegetative parts, and the consequent interference with seed-dispersal set up by the evergreen leaves, goes some way to account for the remarkable limitations in the distribution of nearly all the species to which we shall draw attention later; and this in spite of the efficient wing-mechanism possessed by the seed for transference over a considerable distance.

The general evolutionary aim, then, is the segregation of the flowers to a position of freedom from the leaves. This aim is attained, to a limited extent in § Pyrrhanthos, by enlargement of the individual flowers, by reduction of leaves in the neighbourhood of the flowers, and to a lesser degree by aggregation of the floral shoots, which themselves are abbreviated, so that the flowers tend to mutual proximity. In § Heterochlora the same result is aimed at by enlargement of the individual flowers and by elongation of the pedicels. In § Lygistum the same goal is aimed at in the progressive multiplication of small flowers and their close aggregation into definite inflorescences; it is the "umbellifloral" tendency in operation. These tendencies are accompanied as a matter of course by the aggregation of the inflorescences toward the terminal nodes of the branchlets; never, in the case of *Manettia*, by the elongation of peduncles. Where necessary—*e. g.* in the case of sessile umbels—the pedicels are more or less elongated, as in the series *M. congesta*—*M. congestoides*—*M. verticillata*. These last-named represent the highest degree of aggregation in the genus, with the exception of the two species with capitulate inflorescences on relatively long stalks—*M. capitata* and *M. Miersiana*. Between the extremes the aggregation-tendency is observable in a series of species, reflecting the evolution of axillary umbelloid groups of flowers, seen already in *M. calycosa*, and well-advanced in *M. sabiceoides*, *M. umbellata*, *M. hispida*, etc.

In the way of these inflorescence-tendencies, § Ysginanthus displays various stages of progress. *M. coccinea* and its nearer allies are even less advanced than *M. cordifolia* in this regard. Aggregation, very similar to that which produced *M. congesta*, is observable in *M. dominicensis*, *M. tarapotensis*, etc. *M. fimbriata* bears its flowers many together in more or less elongated racemoid clusters, much like *M. Lygistum*. It would appear that inflorescence-development has taken place within § Ysginanthus independently of, and parallel to that within the other three sections together.

The tendency of the flowers to free themselves from the leaves is thus in most cases subserved by aggregation into dense inflorescences, culminating in the capitulate forms. But such is not invariably the case even among the Lygistum-species; for a few tend to secure the same object by the formation of a lax paniculate inflorescence, freed of the leaves by elongation of the inflorescence-branches. The same tendency is accompanied by considerable reduction in the size of the flower. In this case there is no tendency to suppression of the main rachis of the inflorescence, such as is manifest in the umbellate-fasciculate forms; but rather a general lack of arrest of any of the branches. This tendency is foreshadowed in the small-flowered *M. alba*, and advances a step in the many-flowered cymose panicles of *M. tenuis*. *M. Beyrichiana* has very lax panicles and long slender pedicels, the flowers being more or less free of the leaves and situate mostly well beyond them. The very short stout corolla of *M. alba* is seen also in *M. paniculata* and *M. barbata*, both of which reflect the same tendency to a lax paniculate grouping.

Manettia, then, appears to be at a relatively primitive stage of evolution among Rubiaceæ. All the species are climbing plants, of the simplest sort, climbing sometimes as much as 20 to 30 yards solely by the torsion of their graceful stems. They are devoid of all such adaptations as tendrils, hooks, twining leaf-stalks, etc. In this direction they reveal only such faint tendencies as the deflexed minute bristles and indumentum in the case of *M. boliviana* and *M. Glaziovii*, and the elongated leaf-stalks of *M. glandulosa* and a few others.

GEOGRAPHICAL DISTRIBUTION.

Manettia is essentially a genus of the warmer parts of America; nearly all the species are confined within the tropics. Five are endemic in the temperate zone just south of the Capricorn line. *M. cordifolia*, with a wide distribution in the South American tropics, is found in Argentina and Paraguay.

M. cordifolia and *M. coccinea* are the only two species with anything approaching a wide distribution. The former is chiefly Brazilian, occurring from San Paulo in the south-east to Ceara on the north-east coast, and as far west as the Andes of Peru. In temperate regions it has been found in the hilly parts of Paraguay, and about Tucuman in Argentina. Of the three varieties of this species, var. *glabra* is much better known than the parent-species; it is identical with *M. glabra* Cham. & Schl., which invariably appears in cultivation and illustration (see *supra*, p. 6) as *M. cordifolia* itself. This variety has been recorded from Peru and Bolivia in the west to Bahia in the east of the tropical region. But it seems to be more abundant south of the tropic—in Paraguay, Uruguay, and Entre Rios. Var. *attenuata* has appeared in Minas Geraes as well as in Peru; and var. *filiformis* comes from northern Paraguay.

M. coccinea, on the other hand, is essentially a western species, being recorded from Mexico, throughout the states of Central America, throughout the West Indies, and by way of Trinidad to French Guiana, its most easterly station.

The distribution of all the other species is circumscribed within very narrow limits for each. This is a matter for some surprise, considering the climbing habit of these plants, and the special dispersal-mechanism, in the shape of a broad wing, possessed by the numerous seeds. I have already suggested an explanation of this (p. 8).

Apart from the somewhat doubtful *M. reclinata* (which the reader should consult under the heading *M. coccinea* in the systematic account of the species) Mexico has three native species, one of them, the large-flowered *M. zimapanica*, being endemic; a second, *M. flexilis*, is recorded also from Guatemala and Colombia; the third is *M. coccinea*. Beside the two last-named, Guatemala has one endemic species, *M. orbifera*. Costa Rica claims, beside the ubiquitous *M. coccinea*, two native species, both endemic: *M. barbata* and *M. costaricensis*. Cuba, a land of endemic species, has but one endemic *Manettia*, *M. lygistoides*, so far as the present investigation goes, and only one other native, *M. coccinea*. Of the other West

Indian islands, from the chief of which *M. coccinea* is recorded, Jamaica shares *M. Lygistum* (the first species discovered) with Hayti (San Domingo), the latter having two other native species, *M. calycosa*—found also in Colombia and Venezuela—and *M. domingensis*, endemić in Hayti. In Dominica are found *M. coccinea* and the endemic *M. dominicensis*.

Throughout Central America and the West Indies there are thus only two of the large-flowered species (Pyrrhanthos), namely, *M. zimapanica*, endemic in Mexico, and the isolated *M. domingensis*, peculiar to Hayti. Of the second main group—Heterochlora—the sole representative outside of the South American continent is *M. calycosa*, which has been recorded from Hayti.

As a matter of fact, outside the South American continent only eleven species are native; and all of these, with the exception of *M. calycosa*, *M. flexilis*, and *M. coccinea*, are absent from South America.

Turning now to the latter continent, this is the home of the large majority of the species. The distribution of these appears peculiar largely, no doubt, because of the limitations of the areas over which collections have been made. But even allowing for this, and having in comparative view the distribution of other genera depending much upon the same collectors, certain points in the distribution of *Manettia* are very remarkable. Thus, there are two main areas, namely, 1st. Western South America—including Colombia, Western Venezuela, Ecuador, Peru, and Bolivia; and 2nd. Eastern tropical South America—including the east coast of Brazil, from Ceara in the north to San Paulo (as far as the Capricorn line) in the south, and tropical Paraguay. Beside these are two minor areas of distribution; 3rd. Northern—including eastern Venezuela, Trinidad, and Guiana; and 4th. Temperate South America—including southern Paraguay, Entre Rios, temperate Brazil, Uruguay, and northern Argentina.

The extraordinary limitation of the distribution may be judged from the figures:—Only one species is common to the first two—the principal—areas, namely, *M. cordifolia* (and var. *glabra*). The same species occurs also in the last, the temperate area. The rest of the species native in the eastern area, 20 in all, are peculiar to that area; they comprise 4 of the § Pyrrhanthos, 4 of § Heterochlora, 10 of § Lygistum (including *M. capitata* and *Miersiana*); and *M. mitis* and *M. fimbriata* of § Ysginanthus. The Temperate area has, beside *M. cordifolia*, only 5 native species, all peculiar to it, viz. *M. Tweediana*, *M. chrysoderma*, and *M. sublanata*, of § Pyrranthos; and *M. inflata*, *M. quinquenervia*, of § Heterochlora. *Neither* of the small-flowered sections is represented.

The northern minor area has three native species: the two endemics *M. alba* and *M. Spraguei*, and *M. coccinea*, the latter occurring in Guiana and in Trinidad, by way of which it passes to its West Indian distribution.

We have now to consider the Western area. This is strikingly poor in large-flowered forms. for only two § Pyrrhanthos are native, *M. cordifolia* in Peru and Bolivia, and *M. boliviana*. Of § Heterochlora there are four native species, viz. *M. Smithii*, *M. calycosa*, *M. Holtonii*, and *M. scaberrima*. Of § Ysginanthus 10 species are native here, all endemic, 5 in Colombia, 3 in Peru, and 2 in Bolivia; *M. coccinea*, curiously, is absent from this area. All the remaining species of § Lygistum, with the single exception of *M. flexilis*, which occurs also in Central America, are peculiar to this district, none occurring outside it. Of these 12 are endemic in Colombia and Ecuador; 6 in western Venezuela; 6 in Peru; and 2 in Bolivia.

Broadly speaking, therefore, § Pyrranthos and § Heterochlora species come from that part of South America enclosed between the eastern coast from Bahia to Buenos Ayres and the Parana-Paraguay rivers. § Lygistum and § Ysginanthus have their principal home in north-western South America, save for nine or ten species native about Rio de Janeiro. Beside these, Central America and the West Indies claim one native § Pyrranthos apiece; the sole representative of § Heterochlora outside South America is *M. calycosa*, which is recorded from Hayti; § Lygistum is represented by 2 species in Central America and 2 in the West Indies; and § Ysginanthus by 3 in Central America and 2 in the West Indies, the two latter figures including *M. coccinea*.

In Cultivation.

As a cultivated stove evergreen-plant *Manettia* ranks among the foremost of the vegetable products of tropical America. Yet nothing approaching a complete account of this interesting genus has yet been published, unless we except that of K. Schumann, in the *Flora Brasiliensis*; but this so abounds in error and omission as in many ways to be worse than useless. In 1905 Mr. Sprague, of the Kew herbarium staff, published very helpful accounts of a few of the more critically difficult species, in the Bulletin of the Boissier Herbarium, Series II, volume V. In the previous year the same gentleman published a valuable memoir upon the cultivated species of *Manettia*, in the *Gardeners' Chronicle* (ii. 384). In this he points out that the plant grown previously under the name *M. bicolor* was in fact an undescribed species, which he named *M. inflata*. This example of error, far from standing alone, is the type of many; indeed, the literary history of the genus is, like that of many another, largely one of synonymic confusion.

According to the *Botanical Register*, ix. t. 693 (1823) the first species of *Manettia* to be introduced into cultivation was *M. coccinea* Willd.—"which was lately raised by Mr. Anderson at the Physic Garden, Chelsea, from seed from Trinidad." It is remarkable that this is probably synonymous with *M. reclinata*, the type of the genus as described by Mutis (*infra*). *M. coccinea* has relatively small (less than 2 cm.) flowers, of a rose-pink shade, according to the figure quoted. Far outshining this is the popular *M. cordifolia* Mart. var. *glabra*, with a striking profusion of rich red flowers four or five centimetres long. This beautiful species was first raised in our country by Dr. Neill, of Canon Mills, Edinburgh, in 1831, from seeds sent by Mr. Tweedie from Buenos Ayres. We have had occasion to refer to it in detail in the historical account of the genus, as well as in its place among the species.

Other favourites in cultivation are *M. bicolor* Paxt. (*M. luteorubra* Benth.), and the allied *M. inflata* Sprague, just referred to, the latter being the subject of an excellent coloured figure in the *Botanical Magazine*, t. 7776 (1901), wrongly named *M. bicolor*.

Mr. W. Watson, writing in 1899 in *The Garden*, lvi. 6 (t. 1229) say of *M. bicolor* (the so-called "Manettia Vine") that "it has been in cultivation for about 50 years." *M. inflata*, a native of Uruguay and Paraguay, has been grown in the Water-lily-house in Kew Gardens for some considerable time; it is finer than *M. bicolor*, and is rarely out of flower. Beside these, a robust form of *M. cordifolia*, discovered originally in Peru, the *M. micans* of Poeppig & Endlicher, has been known for a long time in European hot-houses; it is well illustrated in the *Botanical Magazine*, t. 5495 (1865).

A remarkable cultivated species, of unknown native home, is the lost *M. miniata* Ch. Lem. (Flor. des Serres, iv. t. 317 (1848)). According to the figure this was evidently a striking species, with scarlet flowers, of medium size (rather more than 1·5 cm. long), of the fourth section (*infra*), § Ysginanthus, allied to *M. hispida*; but all trace of it now seems to be lost.

The above appear to be the only species that have been introduced into cultivation. Previous accounts of the genus estimate the total number of species at about 30, or 30 to 40. According to the present paper the number of good species hitherto described is 47; and 34 are described as new, bringing the total number to 81.

All the species referred to above are easy to grow, in a compost of equal parts of peat, loam, and sand. They are graceful plants, herbaceous or delicately suffrutescent, being particularly useful to train over trellises, rafters, or pillars. They are readily propagated by cuttings, taken from young shoots, and set in a sandy soil, with the necessary addition of bottom-heating.

KEY TO THE SPECIES.

A. Flowers usually large, rarely less than 3 cm. in length, generally much larger. Corolla clavate, widening gradually from the base upwards, and more or less narrowed at the mouth, glabrous externally (except in two species) .... § PYRRHANTHOS.

Calyx-lobes very small, rarely so much as 4 mm. long, often setaceous.
Leaves 1·5 cm. long at most, not acuminate.
Calyx-lobes oblong, with rounded apex; leaves elliptical .... 1. *domingensis.*
Calyx-lobes setaceous; leaves narrowly lanceolate ... 2. *Tweedieana.*
Leaves rarely less than 3 cm. long, usually 5–8 cm., very acuminate. Calyx-lobes setaceous.
Capsule globose-pyriform .... 3. *gracilis.*
Capsule manifestly oblong .... 4. *Burchellii.*
Calyx-lobes rarely so small as 5 mm. long, never both small and setaceous, always flat and appreciably wide.
Corolla glabrous externally.
Calyx-lobes elongate, grass-like, subsetaceous .... 10. *zimapanica.*
Calyx-lobes not elongate.
Calyx-lobes ample, ovate, foliaceous .... 8. *stipulosa.*

Calyx-lobes not foliaceous, usually oblong.
Leaves incano-tomentellose, especially below .... 9. *sublanata*
Leaves glabrous or pubescent, not white-haired.
Stem with 4 raised translucent angles bearing minute recurved prickles .... 6. *boliviana.*
Stem with no definite raised angles.
Calyx-lobes rotund-ovate, with very blunt apex ... 7. *chrysoderma.*
Calyx-lobes oblong or lanceolate, acute .... 5. *cordifolia.*
Corolla pubescent externally.
Calyx-lobes linear, subsetose, more or less elongate...... 11. *pubescens.*
Calyx-lobes flat, lanceolate to ovate ; leaves saliciform . 12. *angustifolia.*

AA. Flowers of medium size, the corolla more or less cylindrical with stout tube upwards of 2 cm. long, usually swollen at some point of its length or at the base, densely tomentellose externally .... § HETEROCHLORA.

Calyx-lobes linear, more or less rigid and straight, elongated ; corolla cylindric.
Calyx-lobes 5-nerved, pubescent on both sides, with subulate additional teeth .... 13. *quinquenervia.*
Calyx-lobes 1-nerved, glabrous within at least, with no interposed teeth .... 14. *pedunculata.*
Calyx-lobes ovate or oblong, often foliaceous, not elongate nor rigid. Corolla-tube usually swollen above or below.
Flowers solitary or in pairs in the axils, sometimes more, but never numerous.
Calyx-lobes 8.. 15. *Smithii.*
Calyx-lobes 4.
Corolla cylindric, with no manifest swelling ; calyx-lobes not foliaceous ; corolla-hairs short, broad, simple. 16. *luteo-rubra.*
Corolla-tube swollen above or below ; calyx-lobes large, foliaceous, reflexed ; corolla-hairs jointed mostly.
Tube much swollen at base, cylindric above........... 17. *inflata.*
Tube swollen above the middle, narrowed toward apex. Calyx-segments very large and leafy .... 18. *Rojasiana.*
Flowers several together in axillary umbels.
Calyx-lobes flat, broadly ovate .... 19. *calycosa.*
Calyx-lobes lanceolate with strongly revolute margins... 20. *Holtonii.*

AAA. Flowers small, rarely exceeding 1·5 cm. in length, generally much less. Corolla usually hypocrateriform, in a few cases narrowly infundibular, with lobes more or less erect .... § LYGISTUM & YSGINANTHUS.

Inflorescence a compact pedunculate head.
Leaves broadly cordate-ovate, with relatively long stalks .... 76. *capitata.*
Leaves ovate-lanceolate, stalks very short .... 77. *Miersiana.*
Inflorescence not capitate.

B. Leaves small—3–4 cm. long at most—very tough with strongly revolute margins, deeply wrinkled and folded in relation to the main veins.
Corolla-tube 1 cm. or longer ; leaf-veins projecting beneath as very strong ribs .... 21. *scaberrima.*
Corolla-tube 5–6 mm. long at most.
Leaves acute at base.
Leaves glabrous... 22. *recurva.*
Leaves scabridulous above, densely tomentose beneath... 23. *canescens.*
Leaves broadly truncate, often cordate, at base, densely tomentose beneath .... 24. *pichinchensis.*

BB. Leaves never conspicuously thick, folded, nor revolute; herbaceous or fleshy.

Leaves mostly 2–3 cm. long, flat, membranous; veins scarcely appearing on the lower side; corolla 5 mm. 28. *parvula.*

Leaves mostly 4–6 cm. long at least, generally considerably larger. (Except *M. Lindenii.*)

C. Inflorescence of many stalked flowers in axillary fascicles, with no apparent primary peduncle nor main rachis.

Leaves velvety-tomentose beneath .... 55. *verticillata.*

Leaves usually glabrate, never velvety, beneath.

Rete apparent between the main leaf-veins; young parts not pulverulent nor arachnoid .... 53. *congesta.*

Rete occluded; youngest parts pulverulent-arachnoid .... 54. *congestoides.*

CC. Inflorescence 1–∞-flowered, with manifest pedicel, primary peduncle, or main rachis, cymose or decussate-paniculate.

D. Corolla-tube barely 3 mm. long.

Inflorescence very lax, ample, divaricate, many-flowered .... 41. *paniculata.*

Inflorescence abbreviated, of several flowers more or less densely compacted; capsule only 2 mm. in diam. .... 40. *microcarpa.*

Inflorescence few-flowered, or not densely compacted, nor noticeably abbreviated.

Corolla-tube longer than the lobes .... 27. *lygistoides.*

Corolla-tube shorter than the lobes.

Youngest stem-parts quite glabrous (Costa-Rica) .... 39. *barbata.*

Young stem-parts more or less densely pilose (Guiana) .... 37. *alba.*

DD. Corolla-tube upwards of 1·5 cm. long.

Plant conspicuously hairy and hispidulous. (§ Ysginanthus.)

Capsule globose; inflorescence many-flowered. 62. *Pearcei.*

Capsule ovoid, with acute-acuminate apex; inflorescence few-flowered.

Corolla-lobes rotund-truncate at apex ...... 63. *hispida.*

Corolla-lobes lanceolate acute-acuminate ... 64. *miniata.*

Plant glabrous, or nearly so.

Stipular sheath bearing a long setose arista on each side; calyx-lobes 4, free to base .... 42. *Sonderiana.*

Stipules not aristate; calyx tubular at base, usually with 8 lobes. (§ Ysginanthus.)

Stipule simple, truncate or acute .... 72. *coccinea.*

Stipule manifestly 2–3-toothed; plant usually puberulous .... 68. *pleiodon.*

DDD. Corolla-tube 5–14 mm. long.

Corolla-lobes orbicular, 8 mm. broad; calyx tubular at base .... 74. *orbifera.*

Corolla-lobes more or less narrow, oblong, 3 mm. broad at most.

E. Corolla-lobes hairy on back and margins, especially about apex.

Stem densely sericeo-villous, with backward-pointing hairs .... 61. *Glaziorii.*

Stem-hairs spreading when present, never deflexed.

G. Calyx-lobes broadly ovate to oblong.

Ovary densely yellow shaggy-villous, the flowers borne indiscriminately among the

leaves, on ordinary branchlets. Leaves small, hairy on both sides; lateral main veins 3 to 4 pairs .... 58. *mollis.*
Ovary sparsely pubescent-pilose; flowers on slender elongated branchlets much exceeding the foliage-leaves, bearing small round leafy bracts; leaves become large, glabrate, with 6 or more pairs of primary lateral veins .... 59. *Riedelii.*
GG. Calyx-lobes narrowly oblong-lanceolate or linear.
Whole plant, except flowers, glabrous .... 60. *acutifolia.*
Stem and leaves patent-pilose or asperulo-pubescent.
Capsule tapering to a point at the apex ...... 57. *racemosa.*
Capsule with broad blunt apex and turbinate base .... 56. *coccocypseloides.*
EE. Corolla-lobes glabrous, or at most minutely puberulous, on the back.
Fruiting calyx-lobes manifestly leafy and flat, conspicuous, ovate-lanceolate to suborbicular.
Calyx-lobes usually obtuse, scarcely acuminate.
Inflorescence paniculate; plant dries a light green .... 47. *mitis.*
Inflorescence manifestly umbellate.
Calyx-teeth often ovate-acuminate; inflorescence-branches stout, the bracts involucrate, manifest .... 45. *umbellata.*
Calyx-teeth ovate-orbicular; inflorescence-branches very slender, bracts exiguous .. 46. *dubia.*
Calyx-lobes broad below the middle, lengthily acuminate above, with acute apex .... 48. *fimbriata.*
Calyx-lobes often inconspicuous, in flower and fruit, sometimes elongate, then very narrow, curling; never broad and flat (but see *M. dominicensis*).
Calyx manifestly tubular at the base, the tube adnate to the disc, lobes elongate curling.
Calyx-lobes 4; flowers glabrous, even when immature; primary lateral leaf-veins 7–8 pairs .... 71. *Spraguei.*
Calyx-lobes 8.
Young fruit quite glabrous, often on long straggling stalks.
Petioles usually long (over 2 cm.), slender, subscandent .... 69. *glandulosa.*
Petiole rarely longer than 1 cm., straight . 72. *coccinea.*
Young fruit minutely puberulous or pubescent.
Petiole usually less than 5 mm. long.
Stem minutely, densely, evenly pubescent; corolla glabrous outside .... 73. *Sanctæ Martæ.*
Stem coarsely unevenly pilose; corolla-tube hairy outside .... 70. *costaricensis.*
Petiole usually 1·5 cm., or longer .... 66. *tarapotensis.*
Calyx-lobes 4, very small and fleshy (Bolivia). 75. *divaricata.*
Calyx-lobes 4, the tubular basal part absent or obsolete, disc free.
Flowering calyx-lobes 6 mm. or longer, linear-oblong, acuminate .... 65. *dominicensis.*

Flowering calyx-lobes 3 mm. long at most.

Stipular sheath fringed with 6 or more unequal setæ, early deflexed .... 33. *thysanophora*.

Stipular sheath never fimbriate.

Leaves very narrow-lanceolate, caudate-acuminate; stipules with setose interpetiolar aristæ .... 51. *meridensis*.

Leaves ovate, or elliptic, or oblong, at narrowest broadly lanceolate. Stipules not aristate.

Inflorescence very lax, paniculate, with long slender branches, free of and exceeding the leaves .... 49. *Beyrichiana*.

Inflorescence not manifestly lax, the flowers mixed indiscriminately among the leaves.

Primary lateral veins closely set, 8 to to 9 pairs .... 43. *sabiceoides*.

Primary lateral veins, when visible, distant, rarely more than 5 manifest pairs.

Calyx-lobes broadly ovate, sub-rotund, with rounded apex .... 44. *Moritziana*.

Calyx-lobes erect in fruit, acicular-setaceous .... 50. *tenuis*.

Calyx-lobes usually oblong, or deltoid, apex more or less acute.

e. Stipules with a distinct interpetiolar acute-acuminate, deltoid, or apiculate free portion.

Leaf-veins apparent on lower surface, rete manifest; corolla-tube upwards of 6 mm.

Ovary densely pubescent; calyx-lobes often broadly ovate, subobtuse .... 52. *Bangii*.

Ovary glabrous; calyx-lobes narrow, very acute.

Leaves sub-orbicular-ovate, veins very prominent beneath .... 35. *Lygistum*.

Leaves elliptic-lanceolate, veins beneath flat to the surface......... 32. *pisifera*.

Leaf-veins more or less concealed, with no rete apparent between the primary veins. Corolla-tube 5 mm. at most.

Leaves minutely puberulous on both sides, margin ciliate .... 31. *Guilleminiana*.

Leaves glabrous, or sometimes puberulous on lower midrib when immature.

Leaves 4–5 cm. long at most, drying a light fulvous tint; petioles 1–2 mm. .... 27. *lygistoides*.

Leaves 5–6 cm. long at least, drying dark brown; petioles 5 mm. or longer .... 30. *Trianæ*.

ee. Stipules truncate, with no apparent free apical portion.

F. Leaf-veins on under surface quite occluded.

Leaves ovate, margins strongly reflexed.

Ovary glabrous .... 29. *Lobbii.*
Ovary pilose .... 25. *evenia.*
Leaves lanceolate, margins scarcely reflexed .... 26. *corticifer.*
FF. Leaf-veins manifest, at least the primary ones.
Rete conspicuous between the primary veins.
Leaves less than 3 cm. long, usually; corolla-tube less than 8 mm. .... 34. *Lindenii.*
Leaves mostly 5–6 cm. long at least; corolla-tube over 1 cm. 36. *Schumanniana.*
Rete occluded.
Calyx-teeth 8, minute, denticulate; corolla-tube 10 mm. long .... 67. *pectinata.*
Calyx-teeth 4, not minute; corolla-tube rarely over 5 mm. .... 38. *flexilis.*

1. M. DOMINGENSIS Sprague, in Bull. Herb. Boiss. II. v. 266 (1905).

WEST INDIES. Hayti: in pine-scrub, Valle Nuevo, 6175 feet. Fl. 29 May. *Eggers* 2178! Hbb. Mus. Brit. & Kew.

Allied to this species is a specimen in the Sloane collection of Jamaican plants (i. 68) which, most unfortunately—for it makes a third most interesting native species for Jamaica—bears no flowers. But I have little doubt in assigning the plant in question to this genus.

2. M. TWEEDIANA K. Schum., in Mart. Flor. Bras. VI. vi. 169 (1889).

URUGUAY. On the Rio Grande, *Tweedie*. BRAZIL. Santa Catharina; *Tweedie*! in herb. Kew. The collector says that this plant has "beautiful crimson flowers" and "flowers most of the year at Buenos Ayres."

3. M. GRACILIS Cham. & Schl., in Linnæa, iv. 169 (1829).

BRAZIL. San Paulo, *Weir*! in herb. Mus. Brit. Of all the specimens that have been assigned to this species examined by me, the foregoing example approximates most nearly to the original description, especially in the characters of the indumentum, and the small leaves (*ad summum* 1½ *poll. longa*). The leaves and the flowers are considerably larger in the variety.

Var. *α. glabra* Benth., in Linnæa, xxiii. 444 (1850).

BRAZIL. Minas Geraes: Caldas, *Regnell*, i. 366! Sao Paulo: Campinas, *Weir* 226! Rio de Janeiro: *Glaziou* 10909! Jaragua, fl. 27 June, *Bowie & Cunningham*! Hbb. Mus. Brit. & Kew.

4. **M. Burchellii**, sp. nov.

Stirps nisi nonnunquam petiolo minutissime cum vena centrali puberulo ipsis in novitatibus glaberrima, gracillima, scandens, caule tenui lævi striato. *Folia* inter minora, breviter validiuscule petiolata, lanceolata, acutissima necnon valde acuminata; *stipulæ* brevissime vaginantes, inter petiolos brevissime apiculatæ. *Flores* inter majores in axillis sæpius 1–2, pedunculo gracillimo basi bracteis vaginato cohærentibus. *Corolla* clavata extus glaberrima basin versus leniter angustata. *Capsula* manifeste oblonga, lævis, *calyce* persistente coronata lobis parvis setaceis.

BRAZIL. Rancho do Feliz. Fl. July, *Burchell* 4855! in herb. Kew.

Beside the character of the oblong fruit, other critical characters of this species are the nearly complete glabrousness, and the very thin, narrow, and lengthily acuminate *leaves*. These are from 4 cm. to 6 cm. long, and 1 cm. to 2 cm. wide; *petiole* 3 mm.; *stipule* 1 mm. deep. The slender fruiting *pedicels* are from 1 cm. to 2 cm. in length, bearing a pair of narrow, small, membranous *bracteoles* 1 mm. long, towards the base; these are connate below, forming a short sheath. The pedicel passes insensibly into the turbinate base of the *capsule*, which is barely 1 cm. long and 6 mm. wide; *calyx*-lobes 2 mm. long. *Corolla* 3 cm. long.

5. M. CORDIFOLIA Mart., in Denkschr. K. B. Acad. Münch. ix. 95. t. 7 (1824). *Guagnebina ignita* Vell. Flor. Flum. 45. t. 115 (1825). *M. grandiflora* Miq., in Linnæa, xxii. 803 (1849). *M. asperula* Benth., in Linnæa, xxiii. 443 (1850). *M. leianthifolia* Griseb. Pl. Lorenz. 111, and MS. in herb.! *M. ignita* ex parte K. Schum., in Mart. Flor. Bras. VI. vi. 170 (1889).

BRAZIL. Ceara: Araripe, *Gardner* 1699! Bahia: *Blanchet* 2092! 3600! Goyaz: S. Domingo, *Gardner*! Arrayas, *Gardner* 3769! Matto Grosso: Santa Cruz, *Spencer Moore* 553! (see Trans. Linn. Soc. II. iv. 368). Minas Geraes: *Claussen*! *Glaziou* 18295! *Regnell*, i. 367! Bushy places, Rio Claro, *Gardner* 4717! Rio de Janeiro: *Glaziou* 12773! 12774! Sorocaba, in woods, fl. March, *Riedel*!; San Paulo: *Weir* 192! PERU. Pozuzo, Lopes to Cueva Blanca. Fl. June, *Pearce* 215! Andes, 5000–8000 ft. *Pearce* 590! PARAGUAY. Hill-region, Cerros de Tobaty. Fl. Sept. *Hassler* 6426! ARGENTINA. Tucuman: *Dinelli*! *Pearce* 644! *Lorentz*!

This species has a historical interest as being the first of the large-flowered group to be described (see Introduction, p. 3).

Var. *a*. GLABRA K. Schum., in Mart. Flor. Bras. VI. vi. 171 (1889). *M. glabra* Cham. & Schl., in Linnæa, iv. 159 (1829); DC. Prodr. iv. 363 (1830); Sprague, in Bull. Herb. Boiss. II. v. 264 (1905) *M. micans* Poepp. & Endl. Nov. Gen. & Sp. iii. 24 (1845). *M. cordifolia* Hook. Bot. Mag. t. 3202 (1832) (nec Mart.); Bot. Mag. t. 5495 (1865).

The great variation, especially in the indumentum, the shape of the leaves—even upon the same plant—the size of the calyx-lobes, and of the corolla, have led me to conclude that these glabrous forms must rank no more independently than as a variety of *M. cordifolia*. This is the position adopted by Schumann (*loc. cit.*); but Sprague (see p. 12) supports the rank of *M. glabra* as a species (*loc. cit. supra*, also pp. 832–836).

PERU. *Poeppig*! *Maclean*! *Veitch*! Tarapoto, *Matthews* 1343! Huallaga River, *Spruce* 4592! BOLIVIA. Cochabamba, *Bang* 1255! This, like the preceding—more or less,—is a typical example of *M. micans* Poepp. & Endl., a Peruvian form, a vigorously-growing colour-form of the variety under consideration (see Bot. Mag. 5495). Chiquica, 3250 ft. Fl. Feb., *Fiebrig* 2686! Mapiri, 500 ft. Fl. May, *Rusby* 1126! BRAZIL. *Schott* 854! *Poeppig*! Herb. *Gower* 1895! Bahia: Igreja Vilha, *Blanchet* 3281! PARAGUAY, near Campo Duarte, *Hassler* 1237! Sierra de Amambay, *Hassler* 11200! Central Cordillera, *Hassler* 7026! R. Capibary, *Hassler* 4435! Upper River Apa, *Hassler* 8327! 8327 *a*; Central, *Morong* 731! Luque, *Balansa* 2134! ENTRE RIOS. *Tweedie*! *Lorentz*! URUGUAY. Fl. April, *Gibert* 213! High rocky soil, Banda Oriental, *Tweedie*! Islands of Uruguay River, "where I introduced it four years ago; it is become one of the greatest ornaments of the patios of Buenos Ayres. It will climb 20 to 30 yards upon a thread . . . . it is often adorned with humming-birds that feed upon its flowers." *Tweedie* 1!

Var. β. ATTENUATA, var. nov. *M. attenuata* Nees Mart., in Act. Soc. Nat. Cur. xii. 14; DC. Prod. iv. 363 (1830).

Foliis floralibus ipsis plus minus anguste lanceolatis longe acuminatis basi plerumque acutis.

PERU. Tarapoto, fl. August. *Spruce* 3929! An extreme example, with saliciform leaves. BRAZIL. *Schott* 855! Minas Geraes. Seno do Frio, *Gardner* 4718!

Var. γ. FILIFORMIS, var. nov.

Stirps omnino glaberrima, caulibus senioribus ipsis gracillimis, cum petiolis necnon pedunculis filiformibus. *Folia* tenuissime herbacea.

PARAGUAY. North, between R. Apa and R. Aquidaban, Villa Sana, *Fiebrig* 4636!

6. **M. boliviana**, sp. nov.

Frutex scandens glaberrimus, caule quadrangulari subalato in angulis dilute discoloribus dentibus reflexis sæpe onusto minutis. *Folia* lanceolata acuminata acutissima; *stipulæ* in vaginam brevem connatæ breviter late apiculato-acuminatam margine glanduloso-dentatæ. *Flores* inter maximos longe pedicellati clavati. *Calycis* lobi anguste oblongo-lanceolati acutissimi. *Corolla* extus glaberrima. *Stamina* plus minus exserta. *Capsula* ovoidea glaberrima lævissima nec costulata.

BOLIVIA. Guanai-Tipuani. Fl. April to June. *Bang* 1372! *Bridges*! Hbb. Mus. Brit. & Kew.

This species is distinct in the four clearly-marked, almost translucent, raised angles on the stem, with their reflexed teeth, comparable with the similar feature in many species of *Galium*. This is the sole suggestion of a mechanical aid to climbing that I have observed in *Manettia*, with the possible exception of the deflexed indumentum in *M. Glaziovii* (*infra*, no. 61). The thin papery *leaves* are from 5 to 7 cm. long and 1·5 to 2 cm. wide, with *petiole* 2 to 8 mm. long; *stipule*-sheath 1 to 2 mm. deep, the apical portion 1 mm. *Calyx*-lobes 5 mm. or longer. *Corolla* 5 cm. long, 1 cm. wide at the mouth. *Anthers* 5 mm. long and nearly 2 mm. broad.

7. M. CHRYSODERMA Sprague, in Bull. Herb. Boiss. II. v. 264 (1905).

BRAZIL. Santa Catharina, *Fritz Mueller* 123! in hb. Kew.

Distinct in the conspicuous rounded calyx-lobes.

8. **M. stipulosa**, sp. nov.

Frutex scandens, caule subtereti lævi super nodos necnon in juventute puberulo. *Folia* glaberrima paucivenia; *stipulæ* longiuscule apiculatæ, conspicuæ. *Flores* solitarii ramulos terminantes alares breves. *Calycis* lobi ampla ovata foliacea acuminata acuta. *Corolla* magna clavata extus glaberrima.

Brazil. *Gardner*! in herb. Kew.

Readily distinguishable by the large leafy *calyx*-lobes, 1 cm. or longer, and 4 mm. broad. The *leaves* tend to fleshiness; they are elliptical, acuminate toward the apex, acute at the base, 4 to 6·5 cm. × 2 to 3·5 cm., with *petiole* as much as 6 to 7 mm. long; sheath of *stipule* 2 mm deep, the interpetiolar apiculate portion 3 to 4 mm. long, sharply defined from the sheath. *Corolla* 4·5 cm. or longer, with short broad subdeltoid lobes.

9. **M. sublanata**, sp. nov.

Frutex scandens, caulibus junioribus pubescentibus. *Folia* ovata acuminata acutissima, subtus valde discoloria incano-tomentella, *petiolo* brevi validiusculo simile induto. *Flores* maximorum inter breviores. *Calycis* lobi oblongi minusculi acuti. *Corolla* clavata extus glaberrima. *Stamina* valde exserta. *Capsula* ovoidea striato-costulata sparsiuscule puberula. *Semina* magna.

Paraguay. Hilly region, Cordillera de Villa Rica; fl. Jan., *Hassler* 8841! In herb. Mus. Brit.

Remarkable for the white tomentum, especially on the lower surface of the *leaves*. These vary from a broadly lanceolate to broadly ovate shape, 3 to 6 cm. long, 2 to 4 cm. broad, with *petiole* as much as 1 cm. in length; the *stipules* are minute, with a small apiculus. *Calyx*-lobes about 2 mm. long in the flower, and barely 1 mm. wide, increasing to 5 mm. or longer in the fruit, puberulous-glabrescent. *Corolla* 2·5 to 3 cm. long—*i. e.* notably small for this section,—8 mm. wide at the mouth. *Anthers* 3·5 mm. long, glabrous. *Seeds*, including wing, 3 mm. or wider.

Allied to this species, but probably distinct, is an imperfect specimen in the Kew herbarium, collected by *Burchell* (no. 7085), in Goyaz, Brazil. He says, in a note—"corolla pendula roseo-coccinea speciosa. Frutex 10-pedalis scandens. Capsula compresso-didyma."

10. M. zimapanica Hemsl. Diagn. Pl. Nov. Mex. 30 (1878).

Mexico. Zimapan, *Coulter*! in herb. Kew.

With long, grass-like calyx-lobes. This and the West Indian *M. domingensis* are the sole representatives of the large-flowered group outside the South American continent.

11. M. pubescens Cham. & Schl., in Linnæa, iv. 170 (1829). *M. villosa* Cham. & Schl. *loc. cit.* *M. confertiflora* Benth., in Linnæa, xxiii. 443 (1850).

Brazil. Rio de Janeiro: *Glaziou* 14913! 17630! Minas Geraes: Caldas, *Regnell*, i. 368! *Widgren*! Inquiry River, *Burchell* 4837! In herb. Kew.

12. **M. angustifolia**, sp. nov.

Frutex scandens præsertim in novitatibus minute incano-puberulus, caule gracillimo striato. *Folia* papyracea anguste lanceolata acuminatissima, basi sæpius acuta, supra glabrata subtus præsertim in venis perpaucis minute puberula, *petiolo* brevissimo validiusculo dense minute pubescente; *stipulæ* minimæ truncatæ. *Flores* inter majores clavati angustissimi. *Calycis* lobi plani subfoliacei lanceolati acuminati acuti glaberrimi. *Corolla* extus minute pubescens. *Ovarium* læve glaberrimum. *Capsula* glabra ellipsoidea apice nec angustata.

PARAGUAY. Basin of River Alto Paranâ, *Fiebrig* 5734!

The chief critical characters are—the very narrow *leaves*, 4 cm. × 8 mm. to 6·5 cm. × 1·9 cm.; the pronounced *calyx*-lobes, 6 mm. long and as much as 2·5 mm. wide; and the pubescent, very narrowly clavate flowers. Even the leaves that serve as bracts are saliciform in this species; in *M. cordifolia* and its other allies, such leaves are not only smaller, but more or less orbicular, or at any rate relatively broader than the ordinary leaves. *Corolla*-tube 3 to 3·3 cm. long, the deltoid lobes 4 mm. long and 4 mm. wide at the base; the tube is barely 6 mm. wide at the mouth.

13. M. QUINQUENERVIA Sprague, in Bull. Herb. Boiss. II. v. 266 (1905).

BRAZIL. Santa Catharina, *Fritz Mueller* 122! in herb. Kew.

14. M. PEDUNCULATA K. Schum., in Mart. Flor. Bras. VI. vi. 173 (1889). *M. Pseudo-Diodia* Cham. & Schl., in Linnæa, iv. 174 (1829). *M. ciliata* Cham. & Schl. *loc. cit.* 176; K. Schum. *loc. cit.* 174. *Diodia pedunculata* Spreng. Syst. Veg. i. 405 (1825); *Syn.* Cham. & Schl. *loc. cit.* 174.

BRAZIL. Rio de Janeiro: in hedges about the campos; fl. July. *Riedel* 619! San Paulo: *Weir*!

Var. GLABRA, var. nov.

Caule omnino glabro, *foliis* necnon *calycis* laciniis glaberrimis nec ciliatis.

BRAZIL. Rio de Janeiro: foot of the Gavia: fl. December, *Miers* 3310!

Schumann follows Chamisso in distinguishing the glabrous form as a separate species, *M. pedunculata*; but the indumentum may be used critically only with the greatest caution in this genus; as witness the great variation in this regard, for example, in the case of *M. cordifolia* and its allies (*supra*). Indeed, the ovary in the Kew specimen of Riedel's plant is densely pubescent; in the British Museum specimen it is quite glabrous.

15. M. SMITHII Sprague, in Bull. Herb. Boiss. II. v. 267 (1905).

COLOMBIA. Santa Marta, Campo Alegre, 1500 ft., *H. H. Smith* 1393! in hbb. Mus. Brit. & Kew.

This species is very distinct, if only in the number (8) of the calyx-lobes—a unique character within this affinity. The leaves, too, are rough, being minutely scabrid, by reason of the short, tapering, many-celled scale-hairs that cover the upper surface. Similar hairs compose the indumentum of the corolla.

16. M. LUTEO-RUBRA Benth., in Linnæa, xxiii. 445 (1850). *Guagnebina luteo-rubra* Vell. Flor. Flum. 45. t. 121 (1825). *M. bicolor* Paxton, Mag. Bot. x. 28 (*tab.*) (1843); Gardner MS. in herb. no. 5739.

BRAZIL. *Schott* 856! Rio de Janeiro: Mt. Jaragua, fl. June, *Bowie & Cunningham* (seed-list 188)! Organ Mts., twining in bushy places, Parariba, fr. March, *Gardner* 5739! San Paulo: *Burchell* 4688! *Riedel* 316! *Usteri* 3! Minas Geraes: *Glaziou* 19434! Caldas, *Regnell*, i. 369!

This species is of particular interest as representing the earliest published recognition of the generic identity of Vellozo's *Guagnebina* and *Manettia* (see Introduction, *supra*, p. 3).

17. M. INFLATA Sprague, in Gard. Chron. ii. 384, t. 169 (1904); Bull. Herb. Boiss. II. v. 266 (1905). *M. bicolor* Hook. fil. in Bot. Mag. t. 7776 (nec Paxton).

Hort. Kew! URUGUAY. Montevideo: near Salto, banks of Uruguay River, *Gibert* 728! Banda Oriental, *Baird*! PARAGUAY. R. Corrientes, fl. Sept., *Hassler* 4502! R. Alto Parana, *Fiebrig* 5416! Caaguazu, *Hassler* 8906! Near summit of Mt. Aroyo-Bostado, E. of Cordillera de Villa Rica, *Balansa* 2133!

This species has been well distinguished by the author in his description, cited above. A further interesting feature, which seems to me to be critical, is the presence of long tapering jointed hairs, that compose the indumentum of the outside of the corolla in *M. inflata*. The corresponding hairs in *M. luteo-rubra* are short, relatively broad, and one- (at most two-) celled. As the author points out (*loc. cit.*), *M. inflata* is confined to Paraguay and Uruguay; while *M. luteo-rubra* is essentially a native of tropical Brazil.

18. M. ROJASIANA Chod. & Hassler, in Bull. Herb. Boiss. II. iv. 91 (1904).

PARAGUAY. Upper River Apa, *Hassler* 8282! Sierra de Maracayu, *Hassler* 5405! Sierra de Amambay, *Hassler* 10269! 10527!

The large, bulbous flowers, with ample spreading calyx-lobes, are striking features.

19. M. CALYCOSA Griseb. Flor. Br. W. Ind. 330 (1861); K. Schum., in Mart. Flor. Bras. VI. vi. 175 (1889).

WEST INDIES. Hayti: *Schomburgk*! COLOMBIA. *Triana*! Santa Marta: *Funck* 417! At 1800 ft., *H. H. Smith* 1392! Ocaña: at 5000 ft., *Kalbreyer* 360! *Schlim* 89! VENEZUELA. *Ernst* 431! *Funck & Schlim* 153! *Moritz* 34; Tovar: *Fendler* 588! Caracas: near Guarenas, *Buschel*!

This species is transitional, in the characters of the small size and sub-hypocrateriform shape, between § Heterochlora and § Lygistum, approaching the latter in the mode of grouping of the flowers (see Introduction, pp. 5, 8).

20. **M. Holtonii**, sp. nov.

Frutex volubilis, caule densiuscule hirtello-pubescente demum glabrescente notabiliter striato. *Folia* firme chartacea, late lanceo-

lata longe acuminata basi acuta, in juventute scabridula demum supra nitentia glaberrima; *venis* alte sulcato-impressis, subtus asperulo-pubescentia venis primariis (quarum lateralibus utrinque 4) valde prominentibus; *petiolus* brevis dense pubescens; *stipulæ* vaginam brevissimam formantes brevissime inter petiolos apiculatam. *Flores* mediocri subsessilibus in pseud-umbellis dispositis alaribus, pedicellis gracilibus longiusculis dense asperulo-pubescentibus, *ovario* simile induto. *Calyx* ad basin laciniis in. lanceolatis nec majusculis divisus, margine valde revolutis itaque sæpe linearium facie rigidiusculis patentibus, supra glabris dorso pilosis. *Corolla* angusta subtubularis insuper paullo ampliato extus dense tomentella.

Colombia. Cauca: La Paila, *Holton* 606! in herb. Kew.

Allied to *M. calycosa*, from which it is distinguished by the revolute, narrow calyx-lobes, and the coarser, more wrinkled, leaves. These are relatively narrower and much more acuminate than in *M. calycosa*. *M. Holtonii* suggests a further link between our second and third main groups—by way of *M. calycosa* on the one hand, and *M. scaberrima* on the other. *Leaves* 7–9 cm. × 2–2·5 cm., with *petiole* not exceeding 6 mm. *Pedicels* up to about 1 cm. long. *Calyx*-lobes 3·5–4·5 mm.; *corolla* 1·7 cm. or longer.

21. **M. scaberrima**, sp. nov.

Frutex scandens asper, caule gracili novitate necnon maturitate ad nodos pubescente aliter glabrescente striato subtereto. *Folia* subcoriacea demum valde rugosa margine revoluta inter minora plerumque ovata caudato-acuminata basi rotundata sæpe cordata, *petiolo* brevissimo densissime strigilloso; supra pilis rigidulis brevissimis basi bulbosis scabridula, subtus præsertim in venis tandem prominentissimis puberula; *stipulæ* plus minus obsolete vaginantes arista modo setosa onustæ interpetiolari rigidiuscula. *Flores* inter minores anguste tubulares in axillis pauci sub-umbellatim dispositi, pedicelli breviusculi demum longiores graciliusculi dense pubescentes, ovario simile induto. *Calyx* ad basin in laciniis plus minus oblongis margine valde revolutis divisus rigidiusculis foliis simile indutis. *Corolla* *M. calycosæ* pro affinitate parva, extus typice tomentella, lobis latis rotundatis. *Capsula* subglobosa apice truncata puberula plus minus glabrescens.

Colombia. *Linden* 895! Mariquita: La-Palmilla, 5200 ft. *Triana* 1792 (=142)!

This striking species, with its tough, wrinkled, scabrid leaves, is allied to the preceding and to *M. calycosa*; it is distinct especially in the leaf-characters, the aristate stipules, and the calyx-lobes. *Leaves* 2·5–4 cm. × 1·2–2 cm. *Calyx*-lobes 3–7 mm. long. *Corolla* 1·2 cm., or rather larger.

22. M. recurva Sprague, in Bull. Herb. Boiss. ii. v. 835 (1905).

Ecuador. Mt. Tunguragua, 11,000 ft. "Frutex tenuis volubilis ramosus. Flores carnei. Folia carnosa." *Spruce* 5835!

A species of striking appearance, recalling the coarser species of *Hedyotis*, or *Mallostoma*.

Jour. Bot., 57;

23. M. CANESCENS K Schum., in Mart. Flor. Bras. VI. vi. 718 (1889).

ECUADOR. Andes: Mt. Guayrapata. Fl. June. *Spruce* 5438! "Suffrutex volubilis tenuis subramosus. Flores albi."

24. **M. pichinchensis**, sp. nov.

Frutex volubilis, caule valde complanato angulato-sulcato, primo dense pubescente, tardius glabrescente, cortice dilute induto brunneo plus minus annulatim excorticante. *Folia* inter minora subcoriacea margine valde revoluta, venis omnino occlusis, triangulari-lanceolata acuminata acutissima, basi latissime truncata sæpius cordata, *petiolo* valido dense pubescente brevissimo, supra glabra necnon aspera subnitentia in siccitate nigrescentia, subtus valde discoloria densissime incano-tomentella; *stipulæ* triangulares acuminatæ acutæ, vix primo vaginantes, tandem circum nodo cupulam sublignosam formantes tumidiusculam. *Flores* parvi singuli v. pauci in axillis gracilibus in pedicellis oriundi hirtellis. *Calycis* lobi anguste lanceolati crassiusculi rigidi acutissimi longiusculi, ovario sulcato hirtello. *Corolla* inter minimas hypocrateriformis extus glaberrima, lobis oblongis obtusissimis suberectis, ore dense barbata. *Capsula* parva pyriformis extus minute puberula.

ECUADOR. Mt. Pichincha, 10,000 to 12,000 ft., *Couthouy*! *Fraser*! *Jameson* 56! 152! 287! *Lehmann* 495! At 13,000 ft., *Hall* 80!

Allied to *M. pubescens*, but readily distinguished by the truncate or cordate leaf-base. *Leaves* 1·5–2 cm. × 4–9 mm. broad at the base, which is the broadest part; *stipule* 5 mm. × 3 mm., on an average. *Calyx*-lobes 2–3 mm. long. *Corolla*-tube 5–6 mm. long, lobes 2–2·5 mm. *Capsule* 5–6 mm. long, 4 mm. wide.

25. M. EVENIA Sprague, in Bull. Herb. Boiss. II. v. 835 (1905).

ECUADOR. In valle Lloense, 8000 ft. Fl. Aug.–Sept., *Jameson* 352! Pichincha, 12,000 ft., *Jameson* 74! In herb. Kew.

Readily distinguished by the apparently veinless condition of the leaves, and the truncate stipules.

26. **M. corticifer**, sp. nov.

Frutex volubilis, ipsis in novissimis glaberrimus, caule in juventute filiformi mox tamen cortice dilute flavo nitente induto subannulato. *Folia* parva crassiuscula evenia lanceolata acuminata, basi acuta *petiolo* brevi; *stipulæ* truncatæ nec apiculatæ. *Flores* minimi inter folia passim nunc in cymulis nunc racemulis sæpius plus minus subumbellatim dispositi, *pedunculis* sæpius validiusculis, nunquam tamen fasciculati, inter minimos. *Calycis* dentes parvi subulato-lanceolati. *Corollæ* tubus pinguiusculus necnon tamen brevis insuper parum ampliatus, lobi parvi obtusi intus pubescentes. *Capsula* parva pyriformis vix costulata glabra lævis.

COLOMBIA. Pasto, 8800 ft., *ex parte Triana* 1795! In herb. Mus. Brit.

Allied to Sprague's *M. evenia*, but distinct in the narrow leaves with flat margins, the glabrous ovary, etc. *Leaves* 2–4 cm. × 5–13 mm.; *petiole* 3·5 mm. *Calyx*-teeth barely 1·5 mm. long. *Corolla* 4 mm. long. *Capsule* about 5 mm. long.

27. M. LYGISTOIDES Griseb., in Mém. Acad. Amer. Sci. & Art. viii. 505 (1860); Sprague, in Bull. Herb. Boiss. II. v. 833 (1905). *M. Lygistum* Sw. var. *lygistoides* K. Schum. in Mart. Flor. Bras. VI. vi. 180 (1889).

WEST INDIES. Cuba (eastern): Monte Verde, *Wright* 255! hb. Kew.

28. M. PARVULA K. Schum., ex Glaziou, in Bull. Soc. Bot. France, lvi. Mém. iii. 336 (1909), *nomen.*

The following is the first published description:—

Frutex scandens gracilis foliosus glabratus, caule tenuisculo minute præsertim in novitate pubescente, mox cortice dilute flavo-brunneo induto. *Folia* plana lævia chartacea subevenia glabra pro genere minima elliptica v. latiuscule lanceolata acuminata acutissima basi acuta, *petiolo* gracili brevissimo. *Flores* inter minimos 1–2 in axillis in pedicellis tenuibus dispositi, *bracteolis* minutis subulatis basi vix vaginantibus. *Calyx* dentiformibus in laciniis 4 ad basin divisus brevibus triangulari-lanceolatis acutis. *Corollæ* hypocrateriformis tubus insuper paullo leniterque ampliatus extus sparse minute asperulo-pubescens, lobi 4 ampliusculi ovato-oblongi acutiusculi vix acuminati utrinque qua tubus induti patentes. *Capsula* minima subglobosa basi subturbinata.

BRAZIL. Rio de Janeiro: *Glaziou* 17061! 18294!

The affinity is undoubtedly with *M. Lygistum.* The present species is at once recognizable by the small, flat, herbaceous *leaves*, with average size not much more than 2 cm. × 7 mm. The *stipules* form a rather deep sheath, relatively speaking, with a very short apiculate portion. The *calyx*, together with the ovary, is barely 2 mm. in the flower, the small lobes barely half a millimetre. *Corolla*-tube 5 mm. long, and about 2 mm. wide at the mouth; lobes about 2·5 mm. long and 1·5 mm. broad. *Capsule* 3 mm. long, 2 mm. wide.

29. **M. Lobbii**, sp. nov.

Frutex volubilis in novitatibus necnon inflorescentiæ maturæ in axibus circumque nodis ferrugineo-puberulus aliter glabratus, caule lævi striato subterete. *Folia* inter minora crassiuscula margine reflexa subevenia elliptica parum acuminata acutissima basi sæpius acuta, *petiolo* brevi tamen notabili, supra in siccitate olivaceo-nigra subtus valde discoloria dilute flaviusculo-viridia utrinque glaberrima; *stipulæ* truncatæ. *Flores* inter minimos in umbellis paucifloris pedunculatis dispositi alaribus foliis brevioribus. *Calyx* ad basin in laciniis 4 ovato-lanceolatis divisus acutis qua *ovarium* anguste infundibulare glaberrimis. *Corolla* hypocrateriformis, tubo validiusculo insuper paullo ampliato extus glabro, lobis ovatis subacutis intus qua in ore dense pilosis.

COLOMBIA. *Lobb* 97! in herb. Kew.

Allied to *M. Lygistum* and its circle of affinity by way of *M. evenia* and *M. Trianæ*, this species is distinct in the leaf-characters, the truncate stipules, and the glabrous ovary and calyx. *Leaves* 3–5 cm. × 1·3–2·3 cm., with *petiole* 3–7 mm. long. Primary *peduncle* as much as 1·5 cm., or even longer. *Calyx*-lobes barely 2 mm. *Corolla*-tube 7 mm. long, 3·5 mm. wide at the mouth, the limb 6–7 mm. in diameter.

30. **M. Trianæ**, sp. nov.

Frutex alte scandens nisi novitatibus sparsiuscule hirtellis necnon pedunculis pubescentibus glaberrimus; caule validiusculo lævissimo valde complanato nec manifeste angulato. *Folia* firme chartacea subcarnosa venatione vix prominula, majuscula elliptico-lanceolata utrinque longiuscule acuminata acuta petiolata; *stipulæ* vaginam latam formantes brevem insuper brevissime acuto-acuminatæ. *Flores* parvi umbellis paucifloris in alaribus dispositi, *pedunculis* valde complanatis longiusculis dense flavo-hirtis. *Calyx* ad basin laciniis in 4 qua *ovarium* glaberrimis divisus ovato-lanceolatis marginibus valde inflexis nec majusculis. *Corolla* hypocrateriformis extus glabra, tubo brevi pinguiusculo, lobis amplis brevibus patentibus intus dense pubescentibus.

Colombia. Pasto: 8800 ft., *ex parte Triana* 1795! Ecuador. Andes, in woods at the foot of Mt. Tunguragua, *Spruce* 5092!

This species is of critical interest, as it connects the *M. Lygistum*-group, via *M. Lobbii*, with *M. fimbriata* and its allies. Spruce says of his plant, that it is "herba alte volubilis, foliis carnosis. Corolla intus lilacina, extus purpurea, basi virescens." The distinctive characters are, the completely glabrous character of the mature vegetative parts, the rather pronounced leaf-stalks, and the short corolla with lobes densely pubescent on the ventral side. *Leaves* 4 × 1·7 cm. to 6·5 × 2·5 cm., with *petiole* increasing to as much as, or more than, 1·5 cm. in length; the sheath of the *stipules* is about 2 mm. deep, with the apiculate portion about the same in length. *Peduncle* 1 to 2 cm. long. *Calyx*-lobes 2·5 mm. × 1·7 mm., the latter being the breadth when flattened out. *Corolla*-tube 4·5 mm. long, 2 mm. wide at the mouth; lobes 3 mm. long.

31. M. Guilleminiana K. Schum., in Mart. Flor. Bras. vi. vi. 181 (1889).

Brazil. Rio de Janeiro: Mt. Corcovado, *Guillemin* 740 (non vidi).

According to the author, this is allied to *M. Lygistum* through his *M. Beyrichiana*, being distinct especially in the general presence of a puberulous ferruginous indumentum, which covers even the exterior of the corolla.

32. **M. pisifera**, sp. nov.

Frutex volubilis sempervirens, caule pubescente mox cortice dilute flavo-brunneo induto. *Folia* inter minora tenuia plana, in siccitate supra nigrescentia subtus dilute discoloria subcinerea elliptica acuminata acutissima basi acuta, *petiolo* brevissimo, supra fere glabra subtus præsertim in venis incano-hirtella rete subtus interveniente sub lente saltem notabili, venisque manifestis nec tamen prominentibus; *stipulæ* basi vaginantes insuper acuminato-apiculatæ. *Flores* in axillis singuli, nonnunquam subumbellati, *bracteis* parvis subsetaceis basi connatis involucrantibus, sæpius pauci laxe in ramulis foliosis dispositi lateralibus abbreviatis; *pedicelli* filiformes pro rata elongati glabrescentes; *ovarium* subcupulare glabrum; *calycis* laciniæ 4 lanceolatæ glaberrimæ breves acutæ. *Corolla* hypocrateriformis, tubo pinguiusculo insuper vix ampliato extus glaberrimo pro affinitate inter mediocros, limbi angusti lobis brevibus late ovatis obtusis intus (ventro) glabratis. *Capsula* pisiformis glaberrima, calyce coronata persistente.

COLOMBIA. La Banca, 10,000–11,000 ft. Fl. January. *Pearce*! in herb. Kew.

An evergreen twiner with pink flowers, allied to *M. Lygistum* itself, but easily distinguished by the whitish hairs on the under side of the leaves, which are markedly acuminate, and by the stipules. *Leaves* 3–5 cm. × 1·2–1·8 cm., with *petiole* not attaining 3 mm.; sheath of *stipules* 2 mm. or deeper, the acuminate free portion—sooner or later deciduous, 2 mm. or longer. *Ovary* rather more than 2 mm. long in the flower; *calyx*-lobes nearly the same length. *Corolla*-tube 1·2 cm. long nearly, lobes 2·8 × 2 mm. The globose *capsule* is 4 mm. long and wide.

33. **M. thysanophora**, sp. nov.

Frutex volubilis, caule in novitate filiformi sparse hirtello glabrescente subtereti striato. *Folia* inter mediocra plana membranacea herbacea, utrinque præsertim in juventute sparsiuscule hirta, elliptica acuminata utrinque acuta, *petiolo* tenui subelongato; *venæ* primariæ subtus prominulæ lateribus (utrinque ca. 8) pro rata crebræ, rete tamen interveniente vix manifesto; *stipulæ* membranaceam in vaginam brevissimam connatæ mox reflexam margine irregulariter setis numerosis fimbriatam inæqualibus. *Flores* in paniculis dispositi vel umbellis cymosis alaribus inter minores, hypocrateriformes, *pedicellis* sæpe longiusculis filiformibus cum *ovario* campanulato sub anthesin nonnunquam flavo-pulverulentibus tardius glabrescentibus. *Calyx* ad basin laciniis in 4 late ovatis divisus apice sæpe obtusis parvis glaberrimis. *Corollæ* tubus pinguis tamen brevis cylindricus extus glaberrimus, lobi ovati utrinque glabri obtusissimi suberecti.

PERU. *Matthews* 1501! in hbb. Mus. Brit. & Kew.

Allied to *M. Lygistum*, this species is notable for the peculiar stipular structure, and the broad blunt calyx-lobes. *Leaves* 3·5–5 cm. × 1·3–1·9 cm., the *petiole* as much as 7–8 mm. long; sheath of *stipules* barely 2 mm. deep, the setæ of the marginal fringe as much as 2·5–3 mm. in length. *Peduncle* 1–2 cm. long; pedicels 3–8 mm. *Ovary* scarcely 2 mm. long; *calyx*-lobes rather longer than 1 mm., and of the same breadth, or broader. *Corolla*-tube not exceeding 5 mm., lobes 2 × 1·7 mm.

34. M. LINDENII Sprague, in Bull. Herb. Boiss. II. v. 833. (1905). *M. Lygistum* Sw. var. α. *typica* K. Schum., in Mart. Flor. Bras. VI. vi. 180 (1889).

COLOMBIA. *Linden* 1439! VENEZUELA. *Funck & Schlim* 788!

This differs from *M. Lygistum* especially in its truncate stipules and much smaller corolla. Both species have strongly-marked reticulation, especially on the lower surface of the leaves.

35. M. LYGISTUM Swartz, Prodr. 37 (1788). *Lygistum flexile fruticosum, foliis ovatis oppositis, petiolis pedatis, racemis alaribus*, P. Browne, Hist. Jam. (1756) 142, t. 3. f. 2. *L. axillare* Lam. Ill. i. 286. *Petesia Lygistum* Linn. Syst. ed. x. 894 (1759). See also Grisebach, Flor. Brit. W. Ind. 329 (1861).

WEST INDIES. Jamaica; *P. Browne*! *Wright*! *Masson*! *Shakespeare*! *Flor. Jam.* 880! *Dancer*! *March* 814! Moist woods, New Haven Gap, 5500 ft., *Nicholls* 65! Summit of Blue Mt., *Purdie*! Portland Gap, Blue Mt., *Alexander*! Hayti: *Schomburgk*!

This species has a double interest as being the first known of the genus, and also the basis of the identification of *Manettia* with *Lygistum* and *Petesia* (*P. Lygistum*; see historical introduction, *supra*). According to Alexander the flowers are "deep blue." It is essentially a West Indian species, and is distinguished from its allies by the manifestly apiculate stipules, the nearly orbicular leaves, and the narrow, rather elongated calyx-lobes, curling and more or less setaceous at the tip. K. Schumann, in the *Flora Brasiliensis*, treats several of these allied species as varieties of *M. Lygistum*; but their characters seem well worthy of the specific rank to which Sprague (Bull. Soc. Herb. Boiss. II. v. (1905)) has assigned several of them; among these the latter author has properly recalled Willdenow's *M. picta* (*M. alba*, infra), a native of Guiana.

36. M. SCHUMANNIANA Sprague, in Bull. Herb. Boiss. II. v. 834 (1905). *M. Lygistum* Sw. var. *glabrata* K. Schum., in Mart. Flor. Bras. VI. vi. 181 (1889).

VENEZUELA. Tovar: *Fendler* 589! *Moritz* 1807!

Barely distinguishable from *M. alba*, except by the corolla, which is over a centimetre in length.

37. M. ALBA, nom. nov. *M. picta* Willd. Sp. Pl. i. 624 (1797); Sprague, in Bull. Herb. Boiss. II. v. 834 (1905). *M. Lygistum* var. *alba* K. Schum., in Mart. Flor. Bras. VI. vi. 180 (1889). *Nacibea alba* Aubl. Pl. Guian. i. 95, t. 37. f. 2 (1775). *Conotrichia alba* A. Rich., in Mém. Soc. Hist. Nat. Paris, v. t. 14. f. 1 (1829). *Lygistum album* O. Kuntze, Rév. Gén. Pl. i. 287 (1891).

GUIANA. *Aublet*! *Martin*! Karouany: *Sagot* 300! Macouria River: *Jenman* 2470! Mazaruni River: *Jenman* 5305! *Appun* 304! 669! Bartica: *Jenman* 4727! Hbb. Mus. Brit. & Kew.

Discovered in Guiana nearly a century and a half ago by Aublet, this species has not yet been recorded elsewhere—unlike the widely-distributed *M. coccinea*, also the discovery of Aublet, the only other native Guianan species (*infra*). Its most notable character is the short, stout corolla, densely hairy in the mouth (see Richard's excellent figures quoted). This connects the *M. Lygistum*-group with that species-group characterized by a short infundibular corolla, by way of *M. barbata*.

38. M. FLEXILIS Brandegee, Pl. Mex. Purp. 196 (1915).

MEXICO. Chiapas: Cerro del Boqueron; fl. June, *Purpus* 7218! GUATEMALA. Alta Verapaz: Pansamala, 3800 ft. *J. D. Smith* 936! ECUADOR. Chimborazo, 3000 ft. *Spruce* 6185!

39. M. BARBATA Oerst., in Kjob. Vidensk. Medd. Natur. 47 (1852). *M. stenophylla* J. D. Smith, in Coult. Bot. Gaz. lvi. 58 (1913).

COSTA RICA: *Endres* 210! Mt. Aguacate, about 2000 ft., *Oersted*! in herb. Kew.

Derives its name from the dense beard of white hairs about the mouth of the very short funnel-shaped corolla.

40. M. MICROCARPA K. Schum., in Mart. Flor. Bras. VI. vi. 179 (1889).

VENEZUELA. Carabobo *Funck* 783! Tovar: *Fendler* 1997!

Remarkable for the small corolla, widely funnel-shaped above, barely 4 mm. long, as well as for the small fruits 2 mm. in diameter.

41. M. PANICULATA Poepp. & Endl. Nov. Gen. & Sp. iii. 24 (1845).

PERU. Cassapi, *Poeppig*! in herb. Kew.

This identification is supported by Bentham (MS. in herb.). This species, together with *M. Beyrichiana*, is unique in the genus in the inflorescence, which is very lax and diffuse; the effect of the three or four axillary inflorescences at the end of a twig recalls the panicle characteristic of so many species of *Psychotria*. This resemblance, in the case of the species before us, extends also to the individual flowers, which have a very short tube, and are rather funnel-shaped than hypocrateriform.

42. **M. Sonderiana**, sp. nov. *M. punicea* Klotsch MS. in herb. Sonder.

Frutex volubilis novitatibus sparse hirtellis tandem omnino glaber, caule in juventute filiformi mox validiore. *Folia* inter majora utrinque demum glabra, firme chartacea, *venis* prominulis tenuissimis lateralibus utrinque 5–6 rete interveniente sub lente manifesto, ovato-elliptica acuminata subacuta basi subcuneata, *petiolo* brevi graciliusculo; *stipulæ* vaginam brevissimam formantes fere ad lineam transversam reductam insuper arista subsetosa onustam interpetiolari caduca. *Flores* 2–3 in axillis umbellatim dispositi, pedicellis necnon pedunculis longiusculis, *bracteis* parvis lanceolatis basi altiuscule vaginantibus. *Calyx* ad basin in laciniis 4 late lanceolatis divisus demum glaberrimis minusculis tamen subfoliaceis acuto-acuminatis adscendentibus. *Corolla* hypocrateriformis tubo gracillimo extus glaberrimo apice vix ampliato, lobis angustis oblongis limbum pro rata parvum formantibus. *Capsula* oblongo-ellipsoidea glabra costulata.

VENEZUELA. *Moritz* ex parte 839! Caracas, *Linden* 350!

Distinguished among *M. Lygistum* and its allies especially by the conspicuous stipular aristæ, and by the long, very slender corolla. *Leaves* 4·5–7 cm. × 2–3 cm., with *petiole* 5–12 mm. long; *stipules* 3–4 mm. *Peduncle* and pedicels each 5 mm., more or less, in length. *Calyx*-lobes 3 mm. long, increasing to about 5 mm. in the *fruit*, which is 5 mm. long and 3·5–4 mm. in diameter. *Corolla*-tube 1·8 cm. long, the limb barely 7 mm. across.

43. **M. sabiceoides**, sp. nov.

Frutex volubilis caulibus junioribus dense sulphureo-pubescentibus tarde glabrescentibus. *Folia* elliptica papyracea breviter acuto-acuminata brevissime petiolata, supra glabrescentia subtus nisi in venis puberula glabra; *venæ* primariæ subtus prominulæ pro genere lateralibus crebræ (utrinque 8–10); *stipulæ* inconspicuæ minimæ arcuatæ

margine pilosæ. *Flores* inter minores in umbellis validiuscule pedunculatis dispositi paucifloris foliis brevioribus. *Calycis* lobi conspicui ovato-oblongi acuminati acuti accrescentes latiusculi subfoliacei cum ovario glabri. *Corolla* hypocrateriformis tubo gracili pro affinitate longiusculo insuper vix ampliato extus sparse puberulo, lobi oblongi parvi.

COLOMBIA. Mariquita, Quindio, 6500 ft., *Triana* 1793 (=143)!

Readily distinguished by the sulphur-yellow pubescence of the stem, the close venation of the leaves, and the arrangement of the flowers in small, concise, regular umbels. *Leaves* 3–4·5 cm. × 1·5–2·5 cm. *Peduncle* about 7 mm. long, pedicels 4–5 mm. *Calyx*-lobes 3 × 2 mm., more or less. *Corolla*-tube 1·2 cm. long, lobes 3 mm.

44. **M. Moritziana**, sp. nov. *M. Lygistum* Swartz var. δ *Moritziana* K. Schum., in Mart. Flor. Bras. VI. vi. 180 (1889).

Frutex volubilis glaberrimus, caule lævi tereti. *Folia* inter majuscula firme chartacea plana elliptica caudato-acuminata acutissima basi acuta, *petiolo* brevi; *venæ* primariæ cum rete interveniente præsertim infra manifestæ laterales distantes nec numerosi; *stipulæ* truncatæ vaginam formantes ad lineam reductam prominulam. *Flores* inter minores in paniculis dispositi alaribus laxis folia subæquantibus nisi brevioribus; *bracteæ* subulato-lineares. *Calycis* lobi ut ovarium oblongiusculum glaberrimi carnosuli parvi late ovati ad suborbiculares apice sæpius rotundati. *Corolla* hypocrateriformis tubo extus glaberrimo subcylindrico longitudine mediocro, lobis dorso glaberrimis parvis oblongis.

VENEZUELA. Faji: *fl.* Feb.; "cor. carn.," *Moritz* 976! in herb. Mus. Brit.

I regard this as the passage-form connecting the *Lygistum* group with *M. mitis*, *M. fimbriata*, and their allies. The present species is distinct especially in the small rotund calyx-lobes, at most 2·3 × 1·7 mm. *Leaves* 4–7 cm. × 1·5–2·3 cm.; *petiole* 4–7 mm.

45. M. UMBELLATA Ruiz & Pavon, Fl. Peru & Chili, i. 58. t. 90. f. *a* (1798).

I was inclined at first to identify with this species a plant collected by Pearce, in agreement with Sprague's MS. in the Kew herbarium. But comparison with the description, and with the figure quoted above, leave no doubt that this plant is distinct. According to the authors, *M. umbellata* is a native of woods in the neighbourhood of Muña, in Peru, flowering in the late autumn. It has ovate, subcordate *leaves*: the *bracts* form a distinct involucre to the umbellate *inflorescence*, which, according to the figure, has a decidedly stout *peduncle* and primary branches; the *calyx*-lobes are lanceolate; and the *corolla*-tube cylindrical, not widened at all toward the apex. These characters distinguish *M. umbellata* without doubt from Pearce's plant, which I proceed to describe as a new species, viz.,

46. **M. dubia**, sp. nov.

Frutex scandens sempervirens omnino nisi intus floribus glaberrimus, caule validiusculo valde complanato manifeste striato. *Folia*

pro genere inter majora carnosula plana ampla elliptica basi rotundata petiolata apice vix acuminata sæpe obtusa; *venæ* impressæ primariæ nec occlusæ lateralibus utrinque 4–5 nec tamen rete apparente interveniente; *stipulæ* basi altiuscule vaginantes insuper deltoideæ acuminatæ acutæ. *Flores* inter minores hypocrateriformes in umbellis paucifloris pedunculatis dispositi axibus gracilibus alaribus, *pedicellis* elongatis ebracteolatis; *bracteæ* exiguæ. *Ovarium* globosum glaberrimum baccoideum læve ecostulatum, *calycis* lobis coronatum amplis foliaceis planis ovato-orbicularibus sæpius vix acuminatis apice tamen mucronato-acutis. *Corollæ* cæruleæ tubus pinguis extus glaberrimus e basi os versus leviter ampliatus, lobi patentes late ovato-triangulares intus cum ore puberulo-barbati.

Peru. Puitac, 10,000–11,000 ft. Fl. April. *Pearce*, in herb. Kew.

Allied to the preceding species, *q. v.* *Leaves* 6·5–8·5 cm. × 3–4 cm., with *petiole* 8 mm., or longer; *stipule*-sheath 3 mm. deep, the upper acuminate part 2 mm. long. *Peduncle* 6–15 mm. long; *pedicels* as much as 2 cm. *Ovary* 7 mm. long; *calyx*-lobes 6 × 4 mm. *Corolla*-tube 1·2–1·3 cm., 5–6 mm. wide at mouth; lobes 4–5 mm. × 2·5–3·5 mm.

47. M. mitis K. Schum., in Mart. Flor. Bras. vi. vi. 185, t. 104 (1889) (*sensu angusto*—var. *α typica*). I am very doubtful of the synonymy given by Schumann, viz., *Guagnebina mitis* Vell. Flor. Flum. 46, t. 118 (1825) and ? *suavis* Vell. l. c. t. 117, under this species, even if it be associated with the next, *M. fimbriata* Cham. & Schl.—after Schumann's loose way. If this synonymy be correct, then Vellozo's figures must be poor indeed!

Brazil. Rio de Janeiro: *Vauthier* 99! *Miers* 4109! *Glaziou* 9476! *Schott* ex parte 853! St. Estella, *Riedel* 503! near Petropolis, 2000–3000 ft., in mountain-woods, 10–16 July, *Ball*! Oregon Mts.—woods, Imbuhy, 3000 ft., April, *Gardner* 455! Vargem, *Miers*! In hbb. Mus. Brit. & Kew.

Very distinct in the tough leathery oblong *leaves*, often rounded at the base, and the globose *fruits*, crowned by conspicuous rotund-ovate *calyx*-lobes. Schumann regards this and the following as varieties of one species.

48. M. fimbriata Cham. & Schl., in Linnæa iv. 173 (1829). *M. mitis* K. Schum. *loc. cit. sub spec. præc.* var. *γ. fimbriata* K. Schum., & var. *δ rosea* K. Schum. *loc. cit.* *M. acutiflora* Bowie & Cunn. MS. in herb. no. 178, nec Persoon.

Brazil. Rio de Janeiro: *Glaziou* 6569! *Riedel* 621! *Schott* ex parte 853! *Bowie & Cunningham* 178! Fl. rose-coloured, *Bunbury* 423! Ilha dos Frades, Bay of Rio, *Miers* 3278! Corcovado, *Gardner*! Aquas Novas, *Miers*! Valley of Catumbé, up a high mountain west of the aqueduct of Carioca: "volubilis 8-ped. Corolla alba limbo roseo hirto." *Burchell* 1847! Sao Domingos to Isl. Boa Viajem, *Burchell* 2853! Monte da Santa Theresa, *Bowie & Cunningham*!

This species is quite distinct from the preceding, especially in the oblong *fruits* with acute-acuminate foliaceous *calyx*-lobes.

Jour Bot. 57:

49. M. Beyrichiana K. Schum., in Mart. Flor. Bras. vi. vi, 181 (1889).

Brazil. Rio de Janeiro: *Glaziou* 17060! Organ Mts., 3000 ft. A climber in a virgin wood, *Gardner* 456!

Notable for the ample lax paniculate *inflorescence*, with straight, delicate, long branches, bringing the flowers to positions more or less free of the leaves (see *M. paniculata*, *supra* p. 30). The cupular *ovary* bears four short subsetaceous *calyx*-lobes, the flower in general recalling that of the allied *M. pisifera* (*supra* p. 27).

50. M. tenuis, nom. nov. *Lygistum tenue* Rusby, in Mem. Torr. Bot. Club, vi. 45 (1896). *Manettia Rusbyana* Sprague, MS. in herb. Kew.

Bolivia. *Bang*! Sorata, *Bang* 1725! Hbb. Mus. Brit. & Kew. The British Museum specimen is in fruit, and moreover displays the *inflorescence* to advantage. This is very-many-flowered, consisting of pseudo-whorls of fruits upon a more or less elongated rachis. The *capsule* is globose, smaller than an average pea, and crowned by four long subulate-setaceous *calyx*-lobes, by which the species is readily recognizable.

51. M. meridensis K. Schum., in Mart. Flor. Bras. vi. vi. 178 (1889).

Venezuela. Caracas: *Linden* 331! Merida: road to S. Jacinto; flowers (November) pale-rose. *Moritz* 975! Colombia. Ocaña, 4000 ft., flowers (August) white or lilac, *Schlim* 86! Ocaña to Pamplona, open spaces at 5500 feet; a twining shrub 8 to 10 feet high, with stiff leaves, light-violet flowers, turning white. *Kalbreyer* 694!

The first two of the foregoing examples are Schumann's types. He describes the colour of the flowers as "pallide rosacea vel aurantiaca." The plants collected by Schlim and by Kalbreyer (*supra*) would appear to be colour-forms—for they agree with the type-plants in every other detail.

52. M. Bangii Rusby, in Mem. Torr. Bot. Club, iii. iii. 43 (1893).

Bolivia. Yungas, *Bang* 537!

Distinct in the densely pubescent *ovary* and the broad *calyx*-lobes. A plant collected by Bang—no. 1268!—from Cochabamba is almost certainly of this species, or very closely allied to it. Rusby, *loc. cit.* vi. 45 (1896), suggests that this plant is near *M. umbellata*—but his reasons for this suggestion are not clear.

53. M. congesta K. Schum., in Mart. Flor. Bras. vi. vi. 177 (1889). *Guagnebina congesta* Vell. Flor. Flum. 45, t. 120 (1825). *G. axillaris* Vell. *loc. cit.* t. 119. *M. albiflora* Schott, ex DC. Prodr. iv. 364 (1830). *M. rosea* Pohl, ex DC. *loc. cit.* *M. multiflora* Cham. & Schl., in Linnæa, ix. 243 (1834); Bentham (Plantæ Regnellianæ) in Linnæa, xxiii. 445 (1850).

Brazil. *Schott* 852! Rio de Janeiro: *Glaziou* 10908! Minas Geraes: Caldas, *Regnell*, i. 365! *Widgren*!

Schumann (*loc. cit.*) treats this and the two following species as a single species of four varieties; but they seem to me to be quite distinct, and readily separable by the vegetative characters alone—especially the leaf-venation and the indumentum of the young parts (see next species). Bentham (*loc. cit. supra*) has fallen into similar error, associating Regnell's plant with Spruce's no. 5740, which is *M. congestoides* (*vide infra*). The true *M. congesta* has a well-marked reticulum between the main lateral leaf-veins; and the youngest parts of the stem and young leaves are villous-pubescent, but not clothed with arachnoid or pulverulent indumentum.

54. **M. congestoides**, sp. nov.

Frutex scandens caulibus gracilibus lævibus sulcato-complanatis, novitatibus pulverulentibus subarachnoideis mox glabrescentibus. *Folia* plana membranacea lanceolato-elliptica utrinque acuminata acutissima, demum glabra; *venæ* primariæ laterales tenuissimæ paucæ (utrinque 4–5) distantes; *petiolo* gracili pro rata longiusculo; *stipulæ* breviter insuper deltoideo-apiculatæ basi vaginantes. *Flores* hypocrateriformes inter minimos plurimi in pedicellis longiusculis glabrescentibus in axillis fasciculati ebracteolatis. *Calyx* ad basin in laciniis ovato-oblongis reflexis acutis glabratis majusculis divisus. *Corollæ* tubus angustus cylindricus vix elongatus extus sparse puberulus, lobi rotundati subreflexi nec barbati. *Capsula* parva subglobosa glabrata lævis nec costulata.

Brazil. Rio de Janeiro: *Glaziou* 10905! St. Estrella, *Riedel* 622! Vargem, *Miers*! Corcovado, *Gardner* 766! *Miers*! Mountain Pass, Jaraqua, 27 June, *Bowie & Cunningham* 166! 169! Organ Mts., *Miers* 3600! 4108! *Gardner* 5740! Hbb. Mus. Brit. & Kew.

Readily identified by the glabrate leaves, the absence of any apparent rete between the primary leaf-veins, and the arachnoid-pulverulent indumentum upon the youngest parts of the stem and the young leaves. *Leaves* 4–8 cm. × 1·5–2·5 cm., with *petiole* 4–8 mm. long. *Pedicels* as much as 1 cm. long. *Calyx*-lobes 2 × 1·5 mm. *Corolla*-tube 6 mm. long, limb 3 mm. in diameter.

55. **M. verticillata**, sp. nov.

Frutex scandens caule pro genere validiusculo in novitate dense flavo-subtomentoso demum pubescente sulcato striato. *Folia* inter majora papyracea plana ovata v. lanceolata apice acuminata acuta basi acutiuscula, *petiolo* longiusculo dense hirtello, supra asperulo-hirta subtus velutino-tomentosa; *venæ* primariæ laterales subtus manifestæ utrinque 6–8; *stipulæ* basi breviter necnon late vaginantes insuper notabiliter apiculatæ. *Flores* minimi ad nodos plurimi globiforme fasciculati, *pedicellis* tenuibus tardius elongatis dense flavo-hirtellis. *Calycis* lobi pro rata majusculi lanceolati plani pilosissimi. *Corolla* hypocrateriformis lobis præsertim versus apicem pilosis. *Capsula* anguste oblanceolata extus pubescens, lobis calycinis persistentibus conspicuis coronata nec magna, basi in pedicellum leniter insensim contracta.

Brazil. Rio de Janeiro: Organ Mts., *Gardner* 458! St. Estrella, *Riedel* 502! In herb. Kew.

Affinity with *M. congesta* appears in the fascicles of numerous flowers at each node; the present species is distinct in the velvety leaf-indumentum—a rare feature in this genus. *Leaves* 6–8 cm. × 2·5–3·3 cm., with *petiole* 1 cm. or sometimes longer. *Pedicels* 8 mm. to over a centimetre long; bracteoles obsolete. *Calyx*-lobes 2–3 mm. *Corolla* 5–7 mm. long. *Capsule* as much as 7 mm. long and 2·5 mm. wide toward the top.

56. M. COCCOCYPSELOIDES Wernham, in Kew Bull. ii. 64 (1914).

COLOMBIA. *Sprague* 244! *Purdie*! *Linden* 982! Fusagasuya, *Holton* 460! Ocaña to Pamplona, open space, 5500 ft. *Kalbreyer* 697! Ibaque, *Goudot*! VENEZUELA. Faji, *Moritz* ex parte 8396! In hbb. Mus. Brit. & Kew.

A twining shrub, with soft leaves and hairy white flowers.

57. M. RACEMOSA Ruiz & Pavon, Fl. Peru & Chili, i. 58, t. 89. f. *a* (1798). *M. mutabilis* Persoon, Synops. i. 134 (1805). *Nacibea mutabilis* Poir., in Lam. Encycl. Méth. Supp. iv. 55 (1816).

PERU. In woods, Cuchero & Chinchao, etc., *Ruiz*.

I cannot find any plant corresponding with the description and illustration of this species in the British herbaria. Schumann cites as an example a plant collected by Moritz, in Venezuela, *ex parte* 839! But this is certainly not *M. racemosa*: the label bears, in Moritz's manuscript, the name that I propose to retain for this species, viz.—

58. **M. mollis** Moritz MS. in herbb. Mus. Brit. & Kew.

Suffrutex repens scandensque, caule præsertim ad nodos densiuscule pulverulento-puberulo, in novitate densissime induto. *Folia* inter minora plana membranacea utrinque pubescentia, *venis* lateralibus paucis, lanceolata ad elliptica acuta acuminata, *petiolo* brevi dense puberulo; *stipulæ* brevissime basi vaginantes insuper breviter necnon manifeste acutissime inter petiolos apiculatæ. *Flores* in ramulis brevibus lateralibus dispositi foliosis. *Calycis* lobi crassi late ovati acuminati accrescentes utrinque pubescentes conspicui tandem subfoliacei, *ovario* densissime molle flavo-velutino-villoso. *Corolla* hypocrateriformis inter minores tubo extus desuper glabrescente insuper ampliato, lobis oblongis patentibus utrinque dorso autem densius apicem versus puberulis. *Capsula* late ellipsoidea flavo-puberula majuscula.

VENEZUELA. "Regions of Ericaeae," *Buschel*! in herb. Kew. Merida, *Moritz* s. n.! ex parte 839! Tovar; *Fendler* 587!

Notable for the conspicuous *calyx*-lobes, 5–6 mm. × 3–4 mm., or even larger, and the dense soft indumentum, especially of the ovaries and young fruits. *Leaves* 2–4 cm. × 1·3–2 cm. *Corolla*-tube nearly 1 cm. in length, lobes 5 mm. *Capsule* 1 cm. long, 6 mm. wide.

K. Schumann (Flor. Brasil.) cites several other plants as examples of *M. racemosa* Ruiz & Pavon. None of them fit either the original description or the published figure of this species. Together with other examples quoted below, these plants may be arranged as described in the preceding and the following few species.

59. **M. Riedelii**, sp. nov.

Frutex volubilis, caule mox valido, primo molliter longe puberulo tardius glabrescente. *Folia* membranacea ellipsoidea basi acuta in petiolum nonnunquam subelongatum angustatum angustata sparse puberulum ad maxima pro genere attingentia acuminata acuta glabrescentia; *venæ* primariæ laterales utrinque ad 8–9. *Flores* inter minores gracilibus in ramulis puberulis cymose dispositi elongatis, *bracteis* foliaceis sæpius parvis subrotundis. *Calycis* lobi ampli dense hirtelli ovati vix acuminati mucronulati subfoliacei. *Corollæ* hypocrateriformis tubus brevis extus sparse puberulus supra sub lobos oblongos ampliatus obtusos dorso præsertim apicem versus barbatos. *Capsula* pisiformis sparse puberula.

Brazil. Rio de Janeiro: *Glaziou* 13966! 13967! *Riedel* 620! In herb. Kew.

Allied to *M. mollis*, from which it is readily distinguished by the much larger *leaves*, 7–12 cm. × 3–6·5 cm., with *petioles* 1–2 cm. long. *Bract*-leaves 6–16 mm. long. *Pedicels* up to 1 cm. long. *Calyx*-lobes 3 × 2 mm., larger in fruit. *Corolla*-tube 9 mm., lobes 5 mm. long. *Capsule* 6 mm. in diameter.

60. M. ACUTIFOLIA Ruiz & Pavon, Flor. Peru & Chili, i. 58, t. 89. f. *b* (1798). *M. acutiflora* Persoon, Syn. i. 134 (1805).

The distinguishing characters of this species, which I have had no opportunity to see, are the glabrousness of all the vegetative parts, and the villous covering of the purple corolla which, according to Schumann (Flor. Bras.), is a centimetre in length. The type was gathered in the woods of Panatahua, between Acomayo and Pati, Peru.

61. **M. Glaziovii**, sp. nov.

Frutex volubilis caule valido quadrangulari in novitate densissime tardius sparsius pilis sericeo-velutinis deflexis induto. *Folia* membranacea pro genere inter maxima, ovata v. elliptica acuminata acuta, basi nonnunquam rotundata, *petiolo* sæpe longiusculo valido dense tomentoso, supra asperulo-pubescentia subtus dense velutino-tomentosa, *venis* lateralibus utrinque primariis 6–8. *Flores* parvi pauci (ca. 2–4) in axillis cymose dispositi. *Calycis* lobi oblongi acuti dense pilosi. *Corollæ* hypocrateriformis tubus brevis extus pubescens, lobi suberecti ovati obtusi apice præsertim barbati. *Ovarium* dense tomentosum.

Brazil. *Glaziou* 10907! In herb. Kew.

Of all the species concerned this, I consider, approximates the most nearly to *M. racemosa*. It is unique in the strongly deflexed velvety hairs that cover the young stems, the large leaves, velvety beneath, and the stout *petioles*, as long as 1·6 cm. or more. *Leaves* 7–9 cm. × 3–4·5 cm. *Pedicels* about 7 mm. or longer. *Calyx*-lobes 6 mm. long. *Corolla* nearly 1 cm. long.

62. **M. Pearcei**, sp. nov.

Frutex sempervirens scandens caule juniore filiformi dense pubescente tardius quadrangulari cortice flavo-brunneo dilute induto. *Folia* inter majora elliptica basi acuta, breviter petiolata, apice acuminata acutissima, supra scabridula glabrescentia subtus hispidula pilosa, *petiolo* densissime tomentello. *Flores* pro rata majuscula in cymis plus minus umbellatis multifloris dispositi dense pilosis foliis brevioribus, *pedicellis* nonnunquam elongatis gracilibus dense hispidulo-pubescentibus. *Calyx* ultra medium nec tamen ad basin laciniis in 8 lanceolatis acutis ciliatis v. fere glabris divisus, basi disco adhærens. *Ovarium* dense flavo-tomentosum. *Corollæ* hypocrateriformis tubus cylindricus extus sparse puberulus intus in ore infra necnon stamina flavo-pubescens, lobi late ovati apice barbellati ciliolatique, aliter glabrati. *Capsula* globosa pubescens apice subtruncata.

COLOMBIA. Near Moro, common along road-sides, 4000–5000 ft., *Pearce*! Road to Cueva Grande, 7000 ft., *Pearce* 288! in herb. Kew!

Flowers red. Related to *M. hispida*, but distinct in the many-flowered inflorescence, the globose capsule, narrower corolla-limb, etc. *Leaves* 6–10 cm. × 2·5–4 cm.; *petiole* to 8 mm. *Pedicel* to 1·5 cm. or longer. *Calyx*-lobes 5 mm. or longer. *Corolla*-tube 1·5 cm. long, lobes 6 × 4 mm. *Anthers* 4 mm. long.

63. M. HISPIDA Poepp. & Endl. Nov. Gen. & Sp. iii. 24, t. 228 (1845).

PERU. Cuchero: Yurimagua, Maynas. *Fl.* Feb., March. *Poeppig.* I have not seen a specimen. In the description the corolla is described as red (*punicea*).

64. M. MINIATA Ch. Lem. Fl. des Serres, iv. t. 317 (1848).

Schumann has hazarded two distinct guesses at the identity of this, querying the synonymy as *M. cordifolia* and also as *M. coccinea*. To neither of these does *M. miniata* bear much resemblance, as a glance at the excellent figure, just quoted, will show. This species is of particular interest, as attention was first drawn to it under cultivation, in the celebrated Van Houtten Garden. Thither it had been sent from England, in 1845; its native country is unknown. Lemaire rightly described it as a new species allied to *M. hispida*; it is evidently a very attractive plant, with rather large scarlet flowers, turning to rose. Yet it seems to have dropped entirely out of notice; there is no mention of it in the standard dictionaries of horticulture, such as those of Nicholson, Bailey, etc. (see also Sprague, in Gard. Chron. 1904, ii. 384).

65. **M. dominicensis**, sp. nov.

Frutex scandens nisi inflorescentiis fere glaber, caule lævi nunc subtereti striato nunc subquadrangulari angulis minute hirtellis. *Folia* firme chartacea majuscula ovata acuminatissima acuta, basi sæpe subrotundata petiolata, *venis* primariis subtus conspicuis paucis rete interveniente nec apparente; *stipulæ* parvæ deltoideæ acutæ. *Flores* in umbellis alaribus pedunculatis sæpe multifloris dispositi, *pedicellis* sæpe elongatis qua ovaria plus minus dense hirtellis. *Calycis* lobi 4 longiusculi angusti lineares. *Corollæ* hypocrateriformis tubus validiusculus breviusculus extus minute puberulus intus in ore dense barbatus, lobi oblongo-lanceolati extus glabri margine necnon intus fimbriati. *Capsula* depressa subglobosa glabrescens mediocra.

West Indies. Dominica: *Ponthieu*! *Ramage*! *Imray* 216! Lake Roseau Mts., *Eggers* 53! St. Vincent: common locally, Mt. St. Andrews, 1500–2500 ft., *H. H. & G. W. Smith* 730!

A climber, on trees, etc., up to 30 feet high, with white flowers. Allied to *M. coccinea*, it is distinct in the short stout corolla, the more individualized inflorescence, and the small depressed fruit. *Leaves* 5–9 cm. × 3–4 cm.; *petiole* barely reaching 1 cm. *Peduncle* 1–1·5 cm., *pedicels* to 1 cm. or longer. *Calyx*-lobes 5–7 mm. *Corolla*-tube 8 mm., lobes 5·5 mm. *Capsule* 6 mm. long, rather more in width.

66. **M. tarapotensis**, sp. nov.

Frutex volubilis caule demum subtereto striato minute pubescente. *Folia* pro genere inter maxima tenuiter papyracea elliptico-ovata apice acuminatissima acuta, basi nisi subito anguste in petiolum subelongatum glabrum acuminatim desinentia rotundata; *stipulæ* truncatæ conspicue glanduloso-denticulatæ. *Flores* in axillis sæpe numerosi subcongesti, pedunculis vix manifestis, pedicellis glabratis longiusculis. *Calyx* fere ad basin brevissime tubularem laciniis in 8 linearibus subelongatis divisus glabris. *Corollæ* hypocrateriformis tubus longiusculus gracilis extus insuper puberulus. *Capsula* pyriformis in novitate minute pubescens.

Peru. Tarapoto, *Spruce* 4076! 4426!

This ally of *M. coccinea* is distinct in the peculiar *stipules*, with their marginal row of bright yellow glands, the long slender leafstalks, etc. *Leaves* 6–9 cm. × 3–4 cm., the *petiole* 2 cm. or longer. *Pedicels* 1·2 cm. or longer. *Corolla*-tube 1·2–1·3 cm. *Calyx*-lobes 5–6 mm., slightly accrescent. *Fruit* 1 cm. long, 6 mm. wide.

67. M. pectinata Sprague, in Bull. Herb. Boiss. ii. v. 836 (1905).

Colombia. Santa Marta, Las Nubes, 4500 ft., *H. H. Smith* 1665!

68. M. pleiodon K. Schum., in Mart. Flor. Bras. vi. vi. 185 (1889).

I have not seen a specimen of this species, to which Schumann has assigned a plant collected in

Colombia: Mariquita, by *Karsten*.

Its more notable characters are the puberulous indumentum, and the long *corolla*, with ciliate throat and limb.

69. M. glandulosa Poepp. & Endl. Nov. Gen. & Sp. iii. 24 (1845).

Peru. "Herba volubilis aquosa. Flores carnei." Yurimaguas, on R. Huallaga, *Spruce* 3874!

70. **M. costaricensis**, sp. nov.

Frutex volubilis, caule minute pubescente in novitate densius. *Folia* inter minuscula tandem glabra ovata v. lanceolata acuminata basi acuta, *petiolo* brevissimo dense hirtello; *venæ* primariæ subtus prominulæ rete interveniente occluso. *Flores* pauci in pedunculis pedicellisque tardius elongatis pubescentibus cymam axillarem formantes. *Calyx* basi tubularis, lobis 8 insuper divisus glabrescentibus subelongatis. *Corolla* hypocrateriformis extus dense puberula, lobis ovato-oblongis glabratis. *Capsula* majuscula oblongo-ellipsoidea tandem glabra.

COSTA RICA. 3500 ft., *Endres* 2! Tucurrique, Las Vueltas, 2000–2400 ft., *Tonduz* 12873!

A climber with red flowers, distinguished from *M. coccinea* especially in the short puberulous corolla. *Leaves* 3–6 cm. × 1·3–2 cm. *Pedicels* from 1 cm., more or less, in the flower, to 2 cm. or more in fruit. *Calyx*-lobes 3–5 mm. in flower, somewhat accrescent. *Corolla*-tube to 1·2 cm.; lobes 5 mm. long. *Capsule* 1·2 cm. long, 8–9 mm. wide.

71. **M. Spraguei**, sp. nov. *M. coccinea* Wernham, in Kew Bull. 64, 1914, non Willd.

Frutex volubilis glaberrimus, caule subterete in novitate subquadrangulare. *Folia* majuscula papyracea elliptica apice acuminata acutissima basi acuta, *petiolo* brevi gracili; *venæ* primariæ subtus prominulæ laterales utrinque manifestæ 7–8. *Flores* singuli in axillis oriundi inter minores longe pedicellati. *Calyx* basi breviter tubulosus disco lobulato adnatus, lobis 4 elongatis graminoideo-linearibus rectiusculis tarde in fructu maturo (in sicc.) crispatis glaberrimis, denticulis nec interspersis tubi margine integro. *Corolla* extus ipsa in novitate qua calyx necnon ovarium glabra, intus subæqualiter pilosa nisi ore dense pilis articulatis hyalinis barbata, alabastro notabile apiculata. *Antheræ* lineari-oblongæ elongatæ. *Capsula* glaberrima subglobosa.

COLOMBIA. San Martin district, Villavicencio, *Sprague*! In herbb. Mus. Brit. & Kew.

I regarded this originally (*loc. cit.*) as a "form" of *M. coccinea*; but subsequent examination has led me to distinguish it as the type of a new species. In the first place, all the other so-called "4-sepalled forms" of *M. coccinea* have proved, like *M. dominicensis* for instance, to be undoubted new species. Again, Villavicencio, where Mr. Sprague found this plant, lies just to the east of the triple barrier of the Cordilleras, where we should scarcely expect to find a species which has its main distribution to the west of this barrier. The floral material is, unfortunately, imperfect; but critical specific characters are afforded by the complete glabrousness of the flowers—even the immature ones, by the hairy covering of the interior of the corolla, by the calyx, the long anthers, and also by the leaf-venation.

Leaves about 7 cm. × 3·5 cm., the *petiole* not exceeding 7 mm. or so. *Calyx*-lobes 8 mm. or longer. *Anthers* rather more than 5 mm. in length.

72. M. COCCINEA Willd., in Linn. Spec. Plant. ed. IV. i. 624 (1797). *Nacibea coccinea* Aubl. Pl. Guian. i. 96, t. 37. f. 1 (1775). *M. havanensis* & *M. uniflora* H. B. K. Nov. Gen. & Sp. iii. 387 (1820). *M. cuspidata* Bert. ex Spreng. Syst. i. 415 (1825). *M. panamensis* Duch. & Walp., in Linnæa, xxiii. 753 (1850).

CENTRAL AMERICA. MEXICO. Tapijuluya, Ta Casco, *Rovirosa* 337! R. Puyapatengo, Teapa, *Linden* 942! Zacuapan, Vera Cruz, *Purpus* 6359! GUATEMALA. Chajnax, Alta Verapaz, 2000 ft., *J. D. Smith* 1368! Fraijanes, Amatitlan, 3900 ft., *J. D. Smith* 6149! Cubilquitz, Alta Verapaz, 1400 ft., *J. D Smith* 8224! Mazatenango, *Bernoulli* 45! HONDURAS. San Pedro Sula, Santa Barbara, 1000 ft., *J. D. Smith* 5258! American Settlement, *Campbell* 79! NICARAGUA. Chontales: *Seemann* 115! *Tate* 196 (141)! COSTA RICA. Mt. Agnacate, *Oersted* 22! Guapiles, 850 ft., *J. D. Smith* 4837! Tuis, 2112 ft., *Tonduz* 11473! PANAMA. Chagres, *Fendler* 238! Empire Station, *Hayes* 301! Near Panama city, *Seemann* 348!

WEST INDIES. CUBA. Eastern, *Wright* 267! JAMAICA. I have not seen a specimen from this Island, but it is undoubtedly native, if not common, there. ST. VINCENT'S. *Guilding*!

SOUTH AMERICA. TRINIDAD. *Lockhart*! *Crueger*! *Fendler* 417! GUIANA. *Aublet*! *Martin*!

As may be expected from the circumstance of its relatively wide distribution, this species displays a considerable amount of variation, especially in the indumentum and in the size of the flowers. Like *M. alba*, this species was discovered originally by Aublet in Guiana (*supra*, p. 1); but, unlike that species, *M. coccinea* has since been found in nearly every case outside Guiana, its main area of distribution being Central America.

It may seem extraordinary that this species should have been found first in Guiana before the nineteenth century, and have escaped entirely the notice of the earlier collectors in Central America. This, however, is probably not actually the case, as will appear from a consideration of the species which stands as the type of the genus, namely, *M. reclinata* Mutis, in Linn. Mantiss. 553 (1771).

I have not succeeded in tracing this species strictly to its type-origin. Mutis gives the critical generic characters, in his original description of *Manettia*, thus:

Calyx 8-phyll, linear, concave, hirsute, persistent. *Corolla* hypocrateriform, tube cylindrical, exceeding the calyx; limb 4-partite, the lobes shorter than the tube, ovate obtuse bearded within. *Capsule* turbinate, compressed, sulcate, unilocular. *Seeds* few, flat, winged.

I have dealt separately with this description in its relation to the diagnosis of the genus as constituted at present (*supra*, p. 1).

The specific characters of *M. reclinata* (*l. c.* 558) are given thus: Annual, stem herbaceous, weak, branched. *Leaves* ovate acute, subciliate, 1½ inches, pubescent beneath; *petiole* very short, hirsute; *stipules* semicircular, very short. *Peduncle* axillary solitary, many-flowered.

This description is strongly suggestive of *M. coccinea* Willd.; and I have adopted the view that *M. reclinata* is a form of that species. This view derives some support from the distribution of *M. coccinea*, which, as we have seen, is a fairly common plant throughout Central America. Moreover, only three species have ever been recorded from Mexico, apart from *M. reclinata*; one is *M. coccinea*; the others, the quite distinct *M. flexilis* and the large-flowered *M. zimapanica*. Again, beside these three, only two species further have ever been assigned to the whole of Central America; and both of these are endemic in Costa Rica. *M. coccinea* is represented in all the principal states of Central America.

73. **M. sanctæ-martæ**, sp. nov.

Herba gracilis volubilis omnino dense necnon minute pubescens. *Folia* sæpius parvula plana papyracea, utrinque acuminata apice acutissima *petiolo* brevissimo; *stipulæ* obsoletæ. *Flores* inter minores singuli in axillis oriundi, pedicellis sæpe elongatis. *Ovarium* parvum cupulare; *calyx* basi brevissime tubularis, lobis 8 tenuissimis setaceis. *Corolla* hypocrateriformis, extus glaber, tubo pinguiusculo insuper ampliato, lobis suborbicularibus, apice subacutis. *Capsula* parvula globosa.

COLOMBIA. Santa Marta, 1000 ft., *H. H. Smith* 391! St. Sebastian, Nevada de St. Marta. July. Hb. *Hooker*! Hbb. Mus. Brit. & Kew.

A much more delicate plant than the allied *M. coccinea*, with its small lanceolate *leaves*, 2·5–5 cm. × 1–1·7 cm., on *petioles* rarely longer than 2 or 3 mm. The rather showy *corolla*, with tube 1·2 cm. long, and wide round lobes 5 mm. in diameter, is a critical feature. *Pedicels* 1–2 cm., or longer. Flowering *ovary* 2·7 mm. deep; *calyx*-lobes, to 3 mm. *Capsule* about 6 mm. in diameter.

74. **M. orbifera**, sp. nov.

Frutex scandens glaber caule filiformi. *Folia* majuscula tenuiter membranacea ovata acuminata acutissima basi nonnunquam inæqualia petiolata; *stipulæ* ad vaginam brevissimam reductæ arcuatim truncatam, in novitate nonnunquam glanduloso-fimbriatam. *Flores* majusculi singuli in axillis dispositi sæpius longe pedicellati. *Calyx* longe infra medium in laciniis 5–8 lineari-lanceolatis acuminatis acutissimis elongatis glaberrimis divisus. *Corollæ* hypocrateriformis tubus latus extus glaber intus in ore dense pilis barbatus erectis, lobi ampli orbiculares vix acuminati subacuti, tubi dimidium excedentes.

GUATEMALA. Retalhuleu, *Bernoulli & Cario* 1649! In herb. Kew.

Distinct in the large orbicular corolla-lobes, giving the upper part of the bud a bulbous appearance. *Leaves* 4–7 cm. × 2–3 cm., with *petiole* upwards of 1 cm. *Pedicels* to about 2 cm. *Calyx*-lobes 6 mm. or longer. *Corolla*-tube 1·5 cm. nearly, the average width 4 mm.; lobes 8 mm. long and wide.

This species, as the tubular base of the calyx indicates, is allied to *M. coccinea*, which it seems to connect with *M. hispida*. The flower suggests also certain species—*M. inflata*, for instance—of the second main group (§ Heterochlora).

75. **M. divaricata**, sp. nov.

Frutex glaberrimus caule complanato sulcato. *Folia* mediocra papyracea ovato-elliptica apice acuminata acuta, basi acuta *petiolo* longiusculo gracillimo; *stipulæ* mox deciduæ brevissime vaginantes. *Flores* in cymulis ramulis perpendicularibus dispositi notabile divaricatis alaribus, *pedunculo* validiusculo pedicellis subæquante longiusculis; *pedicellus* leniter glaberrimum in ovarium angustatus costulatum, *bracteis* bracteolisque setaceæ exiguæ. *Calyx* basi tubularis disco adnatus, lobis 4 parvis carneis crassis ovatis acuminatis acutis distantibus, tubi margine denticulis plurimis interjectis minutis. *Capsula* subglobosa basi vix turbinata glaberrima.

Bolivia. Cochabamba, *Bang* 1269! In hbb. Mus. Brit. & Kew.

In the absence of a corolla the precise systematic position of this species must remain doubtful. The structure of the calyx and disc proclaim its affinity with *M. coccinea*; and the species is readily distinguished by the arrangement of the flowers in the inflorescence, and in the small fleshy calyx-lobes. The habitat is very isolated; the only other native Bolivian species are all of widely different affinity, the nearest station for *M. coccinea* being Panama. *Leaves* about 6 cm. × 2·3 cm., with *petiole* up to 1·5 cm. *Peduncle* to 1·3 cm., *pedicels* about 1 cm. long. *Calyx*-lobes barely 3 mm. long. *Capsule* about 1 cm. long and wide.

76. **M. capitata**, sp. nov.

Herba volubilis glaberrima delicatula roseo-brunnea in siccitate plus minus nigricans, caule lævissimo. *Folia* tenue papyracea parva late ovata acuminata apice subacuta basi truncato-rotundata, *petiolo* pro rata validiusculo longiusculo; *stipulæ* vaginam formantes brevissimam fere obsoletam margine ciliatam arista setacea interpetiolari onustam. *Flores* in capitulis terminalibus v. subterminalibus longe pedunculatis multifloris exinvolucratis sessiles congesti. *Calyx* ad basin in laciniis 4 lanceolatis angustis acutis divisus. *Corolla* anguste infundibularis nec parva glaberrima, tubo pinguiusculo, lobis 4 late lanceolatis erectis acuminatis acutis. *Discus* pulvinaris necnon cavus. *Stigmata* 2 linearia subelongata minute papilloso-pubescentia.

Brazil. San Paulo: Rio Itariri, *Weir* 290*! Herb. Mus. Brit. ex herb. Miers.

Leaves 2–2·5 cm. × 1·3–1·8 cm., with *petiole* 6–8 mm.; arista of *stipule* 3 mm. long. Floral *head*, excluding corollas, about 8 mm. in diameter. *Peduncle* to 5 cm. or longer. *Calyx*-lobes about 4 mm. long. *Corolla*-tube 6 mm. long, lobes 4 mm. × 3 mm.

Although both fruit and seeds are wanting, I have no doubt that this is a true *Manettia*, in agreement with Miers's notes and drawings upon the specimen. It differs from all the other species of *Manettia*, save the next to be described, in the strictly capitate inflorescence of sessile flowers.

77. **M. Miersiana**, sp. nov.

Herba nisi folia hic inde margine obscure ciliolata glaberrima caule lævissimo striato. *Folia* firme chartacea lanceolata parum acuminata apice obtusa v. rotundata, brevissime petiolata; *stipulæ* obsolete vaginantes subulato-aristatæ. *Flores* in capitulis subterminalibus pedunculatis congesti sessiles multifloris, *bracteis* majusculis subinvolucrantibus 3–4-digitatim partitis interspersis segmentis lineari-lanceolatis. *Calyx* ad basin 4 in laciniis lineari-lanceolatis longiusculis divisus. *Corolla* anguste infundibularis parva extus glaberrima intus basin versus staminum insertionis in vicinitate dense puberula, tubo latiusculo, lobis 4 late lanceolatis erectis. *Discus* pulvinaris. *Stigmata* 2 filiformia subelongata.

Brazil. San Paulo: Rio Itariri, *Weir* 290! In herb. Mus. Brit., ex herb. Miers.

Nearly allied to the preceding, but readily distinguished by the shape and texture of the very shortly-stalked *leaves*. These are 2·5-3 cm. × 1–1·5 cm., and the primary lateral *veins*, in number 6 pairs, are manifest upon the lower surface. *Peduncle* 2 cm. or longer. *Calyx*-lobes 9 mm. long, less than 1 mm. wide. *Corolla* (young, scarcely opened)-tube barely 1 cm., lobes 3–4 mm. long.

Species dubiæ v. plus minus ignotæ.

78. **M. marginata** K. Schum., in Mart. Flor. Bras. vi. vi. 178 (1889).

The description is too imperfect for systematic purposes. The leathery *leaves* are said to be marginate, non-reticulate; the hypocrateriform *corolla* is but 5 mm. in length, and lobed to one-quarter of its length. The habitat is given as the River Orinoco.

79. **M. lutescens** K. Schum., *loc. cit.* 186. *Guagnebina lutescens* Vell. Flor. Flum. 45. t. 116. f. 1 (1825).

The most important character, according to Vellozo's description, confirmed by his figure, is the swollen base of the *corolla*-tube. Comparison with the other figures leads me to conclude that this, like *M. luteo-rubra* (*q. v.*), is meant for one of the Heterochlora-group. Thus it is not unlikely that the species before us is *M. inflata* Sprague; the locality, Rio de Janeiro, is not opposed to this conclusion.

80. **M. utopia**, sp. nov.

Fruticulus scandens nisi inflorescentia hirtella glaberrimus, caule valde complanato-sulcato. *Folia* coriacea utrinque glaberrima margine revoluta rugosula in siccitate subtus valde discoloria dilute flava, supra viridia, elliptica breviter subcaudato-acuminata basi rotundata v. obtusa, *petiolo* gracili nec longo. *Flores* in umbellis cymosis alaribus dispositi foliis brevioribus pedicellati, *pedunculo* valde complanato, *bracteis* exiguis. *Calycis* lobi 4 carnei deltoidei acuti. *Capsula* parva glaberrima.

Colombia. *Triana* s. n.! In herb. Mus. Brit.

Easily distinguished by the texture and colour of the *leaves*, which measure about 5 cm. × 2·5 cm., with *petiole* up to 1 cm.; and by the compact *inflorescence*, isolated from the leaves, with definite *peduncle*, as much as 2 cm. long. The *pedicels* are 5 mm. or longer. *Calyx*-lobes 1·5 mm. long. *Capsule* about 5 mm. × 3 mm.

This is probably allied to *M. microcarpa* K. Schum., and possibly also to *M. marginata* K. Schum.

81. **M. (?) diffusa** Britton, in Bull. Torr. Bot. Club, xviii. 107 (1891).

Bolivia. Guanai, 2000 ft., *Rusby* 2121.

I have not seen an example of this species. It is described as resembling *M. paniculata* in habit, having small *leaves* obtuse or cordate at the base; the *flowers* are disposed in a cymose panicle, with slender *peduncle* and pedicels bearing minute bracteoles. The *corolla* is only 6 mm. long, tubular, and constricted at the base.

It should perhaps be pointed out that the foregoing study, depending as it does solely upon the plants preserved in the two principal British herbaria, cannot aspire to completeness.

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